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May 1989

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High Capacity Scree

By H. Allen Curtis

The quality of any desktop publisher is reflected directly and crucially with the quality of its screen dumps. The purpose of this article is to present high quality, high capacity screen dumps that maximize the capabilities of printers most commonly us by CoCo owners.

The screen dumps formerly developed to w with DESKTOP 1 and DESKTOP 4, the desk publisher programs 1 or 2 and C

05

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The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
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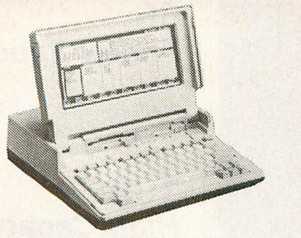
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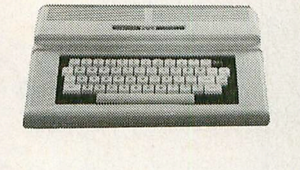
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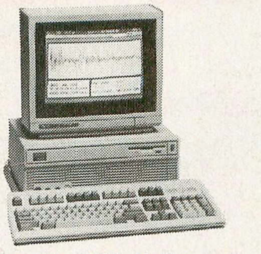
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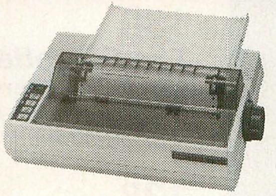
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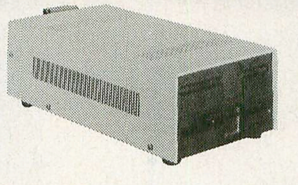
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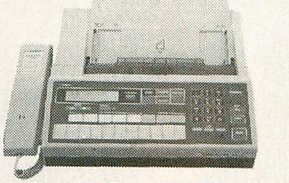
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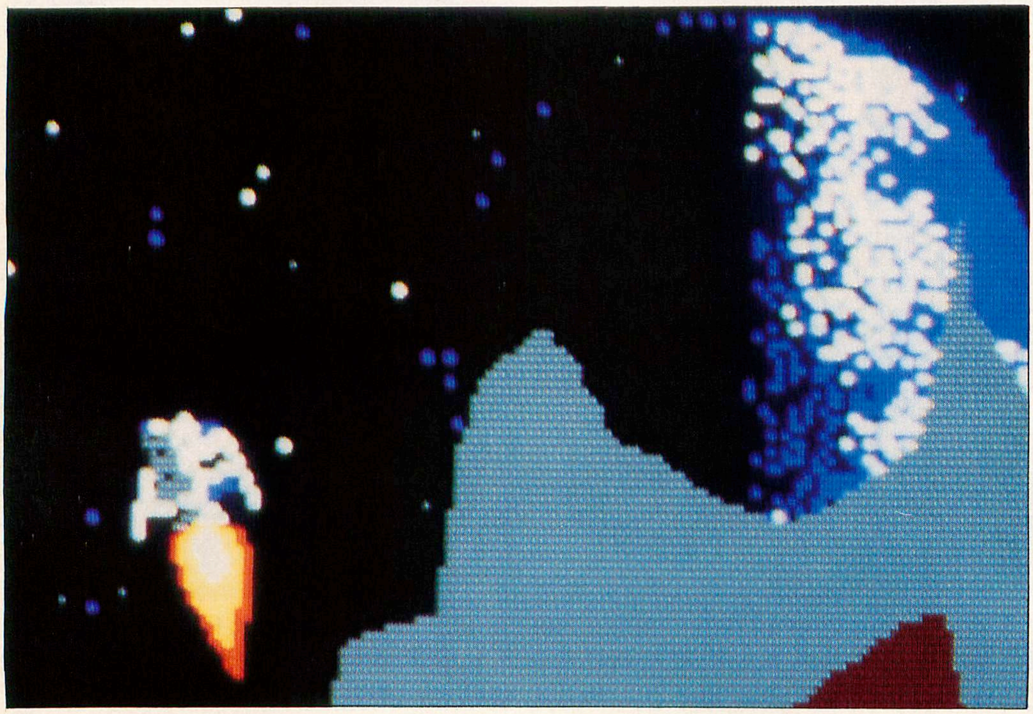
Table of Contents

May 1989
Vol. VII No. 10



28

Features

20
Text for Graphics
Jack D. Welsh
Add captions to the pictures you create

28
Lunar Lander
Jeff Donze
A space shuttle simulation that lets you be the pilot

42
CoCo Derby
Joe Wilensky
And they're off!

46
Having a Party?
R.J. McCorkle
Print invitations, flyers, classified ads, etc., in any style you want

54
Wow! One Disk Drive, Two CoCos
Jeff Baier
Build this adapter to use two CoCos with one disk drive

58
Desktop Publishing Comes to the CoCo
Jeffrey Parker
A look at the desktop publishing packages and accessories

68
Font Selections Made Easy
Edward Jones
Alter those fonts for printing chores

82
3-D Without Glasses
William P. Nee
Part XI: Machine language made BASIC

86
Printer Spooler
Marc Genois
A time-saver for CoCo 3 users

100
High-Capacity Screen Dumps
H. Allen Curtis
High-density printer enhancements for the shoestring desktop publisher

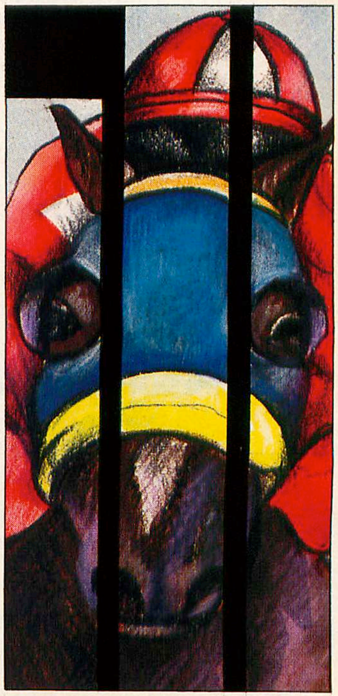
130
The Forgotten Chip
Carl Austin Bennett
Get your modem to work with OS-9 for under $20

138
BASIC09 Programming Tool
Philip Brown
Using Syscall to enhance BASIC09

144
Chown
Evan Robinson
Sharing those system files

26

42



Columns

88
BASIC Training
Joseph Kolar
BASIC bird watching

98
BASICally Speaking
Larry Boeldt
BASIC problems solved here

142
CoCo Consultations
Marty Goodman
Just what the doctor ordered

40
Delphi Bureau
Don Hutchison
That facts about FAX and the database report

136
Doctor ASCII
Richard Esposito
The question fixer

56
Education Notes
Steve Blyn
Fraction action

10
Print #-2,
Lawrence C. Falk
Editor's Notes

80
Turn of the Screw
Tony DiStefano
The ABCs of Disk Drives

92
Wishing Well
Fred Scerbo
The twelve months

Departments

Advertisers Index ______160
Back Issue Info ______49
CoCo Gallery ______26
Letters to Rainbow ______6
Maxwell Mouse ______128
Racksellers ______158
Rainbow Info ______14
Received & Certified ______129
Submitting Material to Rainbow ______116
Subscription Info ______117

Rainbowtech

146
Accessible Applications
Richard A. White
More BASIC09 programming

150
Barden's Buffer
William Barden, Jr.
Interfacing for the all-thumbs CoCoNut

"KISSable OS-9" will return next month.

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on the inside front cover.

Novices Niche

74
Hi-Res Screen Dump
Shane Messer

75
The Timer
Wayne Hufford

75
Beam3D
Joseph Pendell

76
Hot Stuff
Ric Pucella

76
Math Drill
William A. Queen, III

77
$Chores$ for Dollars
Steve Paul

78
Note Card
Darrin Seats

Product Reviews

BASIC Unravelled Series/*Microcom Software* ______118
CoCo Graphics Designer Plus/*Zebra Systems, Inc.* 110
CoCo 3 Wheel/*SPORTSware* ______124
DS-69B Digisector/*The Micro Works* ______121
Dino Database/*RAM Electronics* ______122
Fontgen/*JR & JR Softstuff* ______128
KJV on Disk/*BDS Software* ______124
Keyboard Extender/*HAWKSoft* ______118
Math Tutor/*ZCT Systems* ______113
Orc Ambush/*SPORTSware* ______114
Revenge of the Germs/*The Software Systems* ______116
Printer Drivers for Home Publisher/*Tandy Corporation* ______117
Vehicle Cost Printout/*Alan Hanusiak* ______125

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Cover illustration by Fred Crawford

Letters to the RAINBOW

Double-sided *DeskMate 3*

Editor:

As an owner of a double-sided disk system I realized that using *DeskMate 3*, with two disks configured for a 35-track single-sided system, was a waste of power. So I put everything in one double-sided disk. I just wanted to let you know that the package is now much more enjoyable to use.

Here's what I did. First, format a blank disk as double-sided 40-tracks, using a customized OS-9 Level II system disk. Then, make a boot file on the blank disk using the configuration utility included with the Level II package containing the following options: `p`; `t2`; `d0 - 40d` or `d1 - 40d`; `ddd0 - 40d`; `term - vdg`; no windows unselect the w and w1 that come selected within the utility); and 60 HZ (American Power) for the clock module. After the boot file is generated, select the "No commands, stop now" option and your work with `Config` will be finished. Now you have a bootable double-sided disk ready to receive the files from both *DeskMate 3* disks.

Here is how to `dsave` the files contained in the *DeskMate 3* disks using pipes, so if your customized OS-9 Level II system disk doesn't handle pipes, prepare a new one that can do this, keeping in mind that pipes are useful when dealing with `dsaves`.

With the OS-9 disk in Drive 0, load `dsave`, `copy` and `makedir`. Insert *DeskMate 3*'s Disk 1 in Drive 0 and the newly formatted disk in Drive 1, type `chd/do` then, press ENTER, `dsave /d0 /d1 ! shell`, and press ENTER and wait until the procedure is over. Then insert Disk 2 of *DeskMate 3* in Drive 0 and type `chd/do/cmds` and press ENTER, `dsave /d0 /d1/cmds ! shell` and press ENTER. Don't bother with the Error #218 message that will appear during this last saving procedure, they are "file already exists" errors and will denote only that there are some identical files in both disks of *DeskMate 3*.

When the job above is done, boot this new version of *DeskMate 3* and config it as you want remembering only that both the folders three and four must refer to directory `/d0/cmds`. After configuring your *DeskMate 3* to match your hardware, don't forget to put a write protect tab on the disk. And finally, just reboot your customized *DeskMate 3* and start playing with it. Note that you will be able to format and backup 40-track double-sided disks from within this new *DeskMate 3*.

For those with only one disk drive, change the `dsave` commands accordingly and swap the disk when prompted.

Albert Schriefer
Salvador, Brazil

Click'n Blink

Editor:

I want to contribute a small improvement to Mr. Dingle's excellent *CoCo Pong* program (January '89, Page 63). Considerable improvement is achieved by the following:

Change Line:

```
140 PCOPY1 TO 2:PCOPY1 TO 3
```

Add line:

```
155 PMODE 0,2
```

Change lines:

```
300 PSET (X,Y,1) :PCOPY2 TO 1

310 IF PPOINT(X+MX,Y)=5 THEN MX
=-MX:EXEC43345

320 IF PPOINT(X,Y+MY)=5 THEN MY
=-MY:EXEC43345
```

Add Line:

```
361 PCOPY2 TO 1
```

Change Line:

```
380 PCOPY2 TO 3:SOUND100,5:SOUND
1,4:X=140:Y=RND(131)+19:MS=-MX
:MY=-MY:RETURN
```

These line changes and additions remove the blinking of the paddles and ball and add a small "click" when the ball is hit (`EXEC43345` is a ROM call that does this) without appreciable loss of speed.

John Murvine
Ebensburg, Pennsylvania

INFORMATION PLEASE

Editor:

I am using the genealogy program *Ancestors*, by Christopher Meek, to catalog relatives of the past. Unfortunately, the program has several draw backs, which Chris says he doesn't have the time to devote writing patches for. Since numerous people have written modifications or *Telwriter-64*, I was wondering if the same has been done for *Ancestors*.

If anyone is familiar with adapting *Ancestors* please write to me.

Paul Urbahns
2887 Republic Avenue
Radcliff, Kentucky 40160

The Unknown Pirate

Editor:

Help! I'm a new CoCo user and was trying to make a copy of *DeskMate* that I purchased for my CoCo 2, and I turned off the CoCo before I took the disk out of the drive. No more program. Can anyone send me a copy? I'd be glad to compensate for someone's time and disk.

Y. Jones

Sorry, but if someone were to send you a copied disk they would be guilty of pirating software. Your best bet is to contact your local Radio Shack dealer for a replacement.

Looking for an Ink Well

Editor:

I am the owner of the *Mac Inker* from Computer Friends in Portland, Oregon, one of your former advertisers. They are apparently no longer in business because my letter to them was returned marked "undeliverable". Since I need some more printer ribbon ink, is there anyone who knows where I can buy black ink for printer ribbons?

Norman Thode
7807 Finch Trail
Austin, Texas 78745

Most office supply stores should stock ink for re-inking ribbons.

Editing the Point

Editor:

Can you help me? I am looking for an OS-9 Level II pointers editor (e.g., instead of an hourglass, a cloud with a couple of Z's in it).

Scott Chase
3 Thomas St.
Baxter 3911
Victoria, Australia

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REQUEST HOTLINE

Editor:

I'd like to write a few words to you about a problem the whole European CoCo community faces.

Month after month we avidly read the RAINBOW. Of course, we also read The Database Report, and that's where our frustrations begin. We constantly read of interesting programs uploaded on Delphi, while knowing the programs are unavailable to us. The costs to go on-line on a BBS in the States from Europe are forbidding.

According to the latest telephone directory for Belgium, a conversation with the U.S., not involving an operator, costs more than $2 a minute. If the telephone link is made by an operator, it is almost $2.40 per minute.

Furthermore, in Belgium and many other European countries, not many people have a modem. And moreover, there are only a few BBSs here, most uninteresting.

We fully understand that Delphi is a commercial company with protected interests. We do not expect free programs. But there must be a solution. Couldn't someone at Delphi put these programs on disk to be sold to CoCo users outside the U.S.? It certainly is not going to take away participants from the BBS since buyers would be primarily those unable to log on or who have no modem.

It may also discourage software piracy, a problem that has resulted from a complete lack of support for the CoCo market here.

Ludo LeJeune
Belgium

Good idea! We'll discuss your suggestion with Delphi and keep you posted on the results.

KUDOS

Editor:

I am a CoCo 3 owner as well as subscriber to this remarkable publication. Through the past year I have closely monitored the product reviews and after the January 1989 review of *Max-10*, I called and ordered *CoCo Max III* and *Max-10*. The person I spoke with was polite and extremely professional, answering all my questions promptly and indicating that I would receive my software within 10 days.

I anxiously awaited my order as this was my first purchase through the mail; six days later, during the Christmas season, I received my programs and am absolutely thrilled. My CoCo 3 has come to life, creating graphics and text effectively and efficiently.

Thank you RAINBOW and Colorware.

Paul S. Merchant
Lawton, Oklahoma

Living up to Promises

Editor:

Zebra Systems has one of the fastest delivery systems I have seen. I mailed a check for *CoCo Graphics Designer Plus* on February third, and received it on the 10th. It took only seven days while a friend's order with another company, by credit card, took 14 days.

The product not only arrived quickly, but lived up to its promises. It is much better than the older BASIC version. I found it easy to use and very powerful.

It is nice to see that most companies have great service. I have ordered products from several other companies, but none had the speed that Zebra Systems showed.

Kevin Donnelly
Columbus, Georgia

Some Help from my Friends

Editor:

Recently, I took a computer test for a Jets Team competition. This was through my Physics class. There were tests that pertained to all areas of study (Physics, Math, English, etc.). I placed third overall of about 30 students from many different schools around the area.

The test consisted of many flow charts, converting numbers to decimal, binary, hexadecimal and questions about computers in general. There were also a lot of questions dealing with many languages (Pascal, Assembly Language and FORTRAN).

I'm just writing to say that I couldn't have done that well without the articles I read from Dale Puckett and William Barden, Jr. They explained many technical things in an easy-to-read format. So, thanks and keep up the good work.

Timothy P. DeJong
Rock Valley, Iowa

Out of Rough Water

Editor:

I want to thank Mr. Puckett and others at RAINBOW for your assistance in getting this old retired sailor out of rough water with *Multi-Vue*. After reading his instructions I had no trouble changing my boot. Now I enjoy using that program.

I like using Computerware's word processor *Screen Star*, and would like to know if anyone has changed the screen driver so it will work with *Multi-Vue*? When I try going from OS-9 to *Screen Star* without rebooting I get the message that *Screen Star* takes a special driver. I would like to use it on an 80-column screen.

Melvin A. Grow
Alameda, California

REVIEWING REVIEWS

Editor:

I am extremely dissatisfied with the program *CoCo Newsroom*. When I read the product review in your magazine, I was led to believe that this was a quality program. I find this is not the case.

The Type-up subroutine does not allow for return to the main menu. There is no way that I could find to move to the Lay-Out program after preparing the text. This is not to mention the clumsy process for setting up the text. There is no wrap-around feature at all. If the word typed is too long for the line, it divides haphazardly between two lines of text.

The *Newspaper Picture* Disk would not load. I suspect this was because it has no graphics programs on it to load. I wonder what else is missing from this program.

All in all, this was a frustrating experience. Paying good money for shoddy merchandise gives all software companies a bad name. I suppose it might be silly to expect a refund, but I am going to ask for it anyway.

Dennis D'Ovidio
Bristol, New Hampshire

CoCo Newsroom, *which was previously sold by Spectrum Projects and Microcom Software, is no longer on the market. Eric Wolf, the author of the program, has revised the program and has given Second City Software exclusive rights to sell the new version, now called* Newspaper Plus.

Second City Software is offering owners of CoCo Newsroom *to upgrade to the new* Newspaper Plus *system for $19.95. Simply send your original disks and manual, along with $19.95 to Second City Software and your original copy will be replaced with* Newspaper Plus.

For more information on Newspaper Plus, *see "Desktop Publishing Comes to the CoCo" beginning on Page 58 of this issue.*

Another View

Editor:

I take mild exception to the review of *Max-10* by Jim K. Issel in the January '89 issue of THE RAINBOW. His unreserved enthusiasm for the program is understandable. It is a remarkable program for those who want a graphics-based word-processor or desktop publisher. However, I think a word of caution is in order: this is not a word processor for the beginner or, for anybody's only word processing program. One reason is that as a graphics-based program, its printed output is painfully slow for text-only applications. For those who want to mix pictures with text or use a variety of fonts, that is a perfectly acceptable trade-off. But for those who will be using a word processor mostly for straight text, to type letters, memos, reports, etc., a character-based word processor like *Telewriter-128* would be easier to use and would be much faster in producing a printed copy. Also, for typing a straight-text document, I find the mixture of keyboard and joystick operations required by *Max-10* to be unnatural and awkward compared to the keyboard-only operation of a character-based word processor.

So, to alter Jim Issel's bottom-line comment, if you want to mix pictures with text, experiment with fancy fonts or unusual layouts, this is a marvelous program that's a lot of fun to use — buy it, you'll like it! But if you want a work-horse word processor primarily for typing text, buy something else, you'll be glad you did.

Dave Otis
Montpelier, Vermont

Copy Protection a Nuisance

Editor:

I purchased a CoCo 3 and must applaud MicroWorld for their good service. The one thing that I don't like about the new machine is its incompatibility with some of the best software, such as *CoCo Max II*. It seems that some programmer could come up with a way to fully emulate a CoCo 2 on the new machine. Part of this incompatibility can be overcome by disabling all CoCo 3 commands with `POKE 65502,0` (`POKE 65503,0` to re-enable) and some others by running `ROMRAM` as published in previous editions of THE RAINBOW. I have found that *CoCo Graphics Designer* requires `ROMRAM`, while *Don't Forget!* will run correctly after the poke. If anyone can find a simple method to run *CoCo Max II* please let me know.

I have recently ordered *Max-10*, and like the features. What appalls me is the copy protection scheme, which will be a major nuisance when using a Hi-Res Joystick Interface. The ad, which states "disk not copy protected", is misleading, as it suggests that no protection is used. This hardware protection scheme would have been unknown to me if not for your thorough review in January. I have seen such devices for PCs, but had hoped not to see such for the CoCo.

Francis G. Swygert
Apo, San Francisco

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Word Power 3.2

> *"... friendly...amazing execution speed...much easier to use than VIP software & 2 other word processing systems I've tried...very user-friendly...massive text storage capacity ...highest among word processors..."* - **Rainbow Oct. 88 Review for Word Power**

More Versatile • More Powerful With Spooler • Calculator • Split-Screen • 2-Column Printing

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text **in two columns!** Create professional documents without hours of aligning text.

SPELLING CHECKER

Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to /delete words from dictionary.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & $5.00 to cover S&H costs & instructions)

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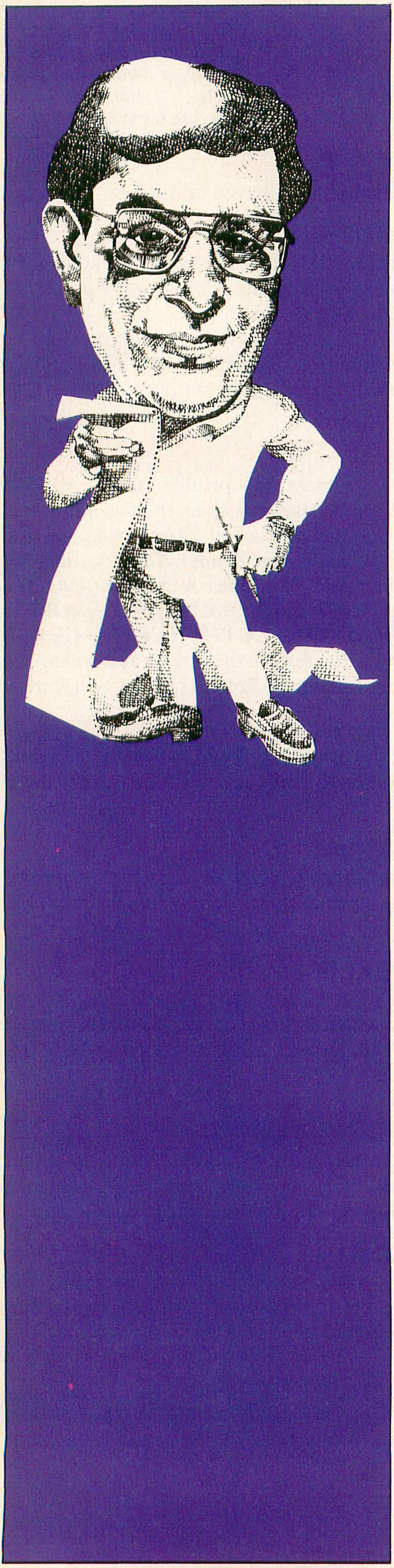

Balancing a RAINBOW

One of the most difficult things about publishing THE RAINBOW has always been the job of *booking* the magazine every month. Booking, you see, is the process by which we select the stories and articles that will appear in its pages.

Managing Editor Jutta Kapfhammer, Submissions Editor Tony Olive and a number of others all contribute to this process. They do a significant job, based on a few guidelines set up by me. Those guidelines are simply that we must have a broad range of ideas, topics and things you can do with your CoCo in each issue.

One thing that amazes me, as we approach our Eighth Anniversary Issue and begin our ninth year of publication, is how well our staff handles this procedure. Another is that the more things change, the more they stay the same.

What I mean is that almost since RAINBOW's inception, we have received letters and calls asking us for "more" of this or "less" of that. Frequently on the very same day, I get letters stating readers' opinions that we have "too many games and not enough serious stuff" and that we have "too much technical material and not enough games or fun projects." The same goes for "too many little simple things" and "not enough short, simple programs."

I have always taken the position that as long as both sides complain, both sides are getting what they want. Remember, THE RAINBOW reaches a wide audience of paid circulation — some 65,000 in all. (By the way, that is not "readership," because we have never used that sort of figure. Some magazines do, figuring something like 7.3 people read each issue and quoting *that* number. We never do.)

One of the reasons for this is because the shape of the CoCo Community is ever-changing. And it changes within the scope of a year as well. It is no secret that more CoCo sales are made in the November-January period than any other and these users are new to our world. We try to hand-hold a little more in the earlier part of the year than at other times; it is one of the reasons our "Beginner's Issue" comes out in January of each year.

Still, except for the occasional lost or torn-up magazine — usually the fault of the postal systems we use (United States and Canadian, plus a lot of other countries to a lesser extent) — the "content" issue is the one we hear the most about.

There are several reasons for it, and one of them is simply that of scale. Take the 160-plus pages in this month's issue and devote 20 of them to games, and you end up with readers deep into OS-9 who are unhappy that 20 pages are "wasted" on games. Yet that represents but 13 percent of the total available pages. Of course 20 pages is about half the total available if we were, say, a little 50-page magazine.

At one time we considered splitting THE RAINBOW up into two parts — a

Max-10™

Best Desktop Publishing / Document Creator for the CoCo 3. Features Pull Down Menus, What You See Is What You Get , UNDO, integrated text & graphics capability , multiple fonts & more. Graphics can be imported from CoCo Max I,II,III, MGE, MGF, 5 Level DS-69, PMODE 4, HSCREEN 2/3 pictures. Supports: DMP 105/130, EPSON MX/FX/RXLX/ Gemini 10 Series, CGP-220 and OKI-92. Only **$79.95**

VIP CALC III

Best Spreadsheet for your CoCo 3. Features 4 color menus, 32/40/64/80 column display, 2 Mhz speed & more. Allows up to 1024 rows x 512 columns. VIP Calc III also has up to 16 windows, trig, averaging, sorting, algebraic & sorting functions. Locate, block move/copy commands & limitless programmable functions. Works with **any** printer. Only **$69.95**

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COLOR SCHEMATIC DESIGNER

By Prakash Mishra

An excellent Circuit Schematic Design Software Package for CoCo 3. Features:

*** Runs in 640x192 at 1.8 Mhz**
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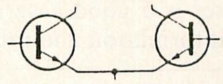
*** Symbol Rotate/Line/Box Draw**
*** Supports 3 Layers of Circuits**
*** Powerful Screen Print Command for DMP/Gemini/Epson Printers**
*** Complete Documentation**

Only $39.95



RSB

A Revolutionary Program that allows you to use Basic Programs from OS9!

OS9 Level 2 is the future of the CoCo. Unfortunately, most Basic Programmers are "afraid" of using OS9 because it is different from Basic. Introducing RSB! It allows you to run Basic from OS9 and take advantage of features such as multitasking, no-halt floppies and high speed operation. RSB is your first step into OS9! Req. OS9 Level II. Only **$39.95**

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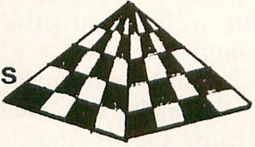

The ancient game of strategy moves into the future. HSCREEN 2 for normal play, HSCREEN 4 for triple level play. Move your pieces through time as well as space. Req. RSDOS 128K CoCo 3 and 2 Players. Disk Only **$24.95**

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by Randall Reid

Patches the Superpatch EDTASM + ® for 80 columns, 47K Buffer (approximately 3000 lines!) & more. Req CoCo 3. Only **$19.95**

GAMES

(Disk only)
(CoCo 1,2 & 3 except where mentioned)

WARRIOR KING (CoCo 3): $29.95
IN QUEST OF STAR LORD(Animated Graphics Adventure for CoCo 3): $34.95 **Hint Sheet**: $3.95
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CHAMPION: $19.95
WHITE FIRE OF ETERNITY: $19.95
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WARGAME DESIGNER (CoCo 3): $29
TREASURY PACK#1: Lunar Rover Patrol, Cubix, Declathon, Qix, keys of Wizard, Module Man, Pengon, & Roller Controller.Only $29.95
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SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows.Only $29.95
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XENOCOPY-PC

An amazingly versatile program that allows you to Format/Duplicate / Read/ Write disks from over 300 different computers. For example you could transfer programs between CoCo, IBM, PC-DOS, TRS-80 Model 3, TRS-80 Model 4, TRS-80 Model 100, Xerox 820, Zenith, Kaypro II, Novell , NEC DOS and much much more!! Send for FREE List. Requires an IBM Compatible with 2 drives. Disk $79.95.

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(From Colorventure)
The ultimate CoCo 3 disk copying utility!! Reads your master diskette once and then makes as many copies as you want. It automatically formats an unformatted disk while copying! Supports 35, 40 or 80 track drives with various step rates. A must for any disk user!! Only $19.95

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Never wait for your printer again!! This Print Spooler allows you to print to your printer and simultaneously continue with your programming. No need to wait for those long printouts! Disk Only $19.95

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A Full Screen Editor for Basic Programs!! A Must for anyone who writes Basic Programs. Only $24.95

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→ UPS 2ND DAY AIR

"serious" magazine and a "fun" magazine. However, after discussions with a lot of people, some surveys of readers and some hard thinking, we decided this would be neither practical nor useful to the CoCo Community as a whole.

Yes, we would probably have stemmed some of the complaints, but our research showed we would have forced easily a third of you to buy two magazines. We would have also ended up pressuring our advertisers to advertise in two places.

Both of those would have been silly for us to do — and destructive to the CoCo Community.

That is why our booking process is so important. We make sure we have a balance because that is what we want and what our research says the vast majority of you prefer. If you are a game fanatic, we've got a bunch of pages of material for you; if you are heavily into OS-9, we have a bunch of pages for you, too. And we will continue to do so.

All we ask is simply to look at what *you* get, not what someone else gets, too. By appealing to the entire CoCo Community as we do, we can afford to produce a top-quality magazine for you every month, hold onto columnists you like, and provide a way for you to learn all the excellent new products available to you by our advertisers.

> ***"We make sure we have a balance because that is what we want and what our research says the vast majority of you prefer."***

THE RAINBOW is an inexpensive purchase both for you and for our advertisers. Assume we deliver 165 pages a month for 12 months: That costs you just a a little more than a penny a page. If, say, we delivered 50 pages every other month, the magazine would cost you five cents a page even if we cut our subscription rate in half.

As far as advertisers are concerned, a comment made by Terry Simons of Des Moines, Iowa, in his CoCo club newsletter is a good case in point. He quotes information and rates from THE RAINBOW and from a newsletter with a claimed circulation of about 1,000. If we use Terry's figures, it costs about $30 to reach 1,000 people through THE RAINBOW, while the cost for reaching the same 1,000 people in the newsletter he mentioned would be $180.

That is pretty much off the subject. I was saying that we at THE RAINBOW work hard to give you a balanced magazine that is useful to everyone. I think our editors do a fine job, and I know most of you agree. For those who sometimes get frustrated, consider the scale of what you hold in your hands right now. It is an important consideration.

Meanwhile, here in Kentucky, the flowers are beginning to bloom and we are making plans for the Eighth Anniversary Issue. It is what we call "Derby season," because the Kentucky Derby is right around the corner.

Derby is exciting and so is spring. But here, there is nothing quite as exciting as planning another Anniversary Issue and looking forward to serving all of you and the CoCo Community in the years ahead.

— Lonnie Falk

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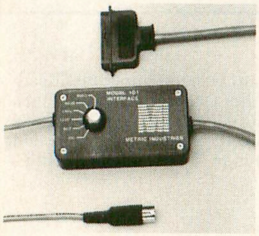
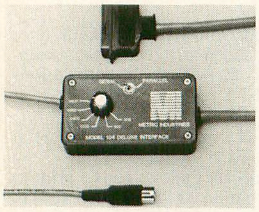
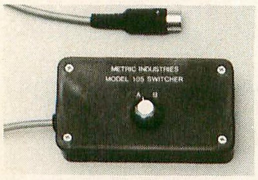


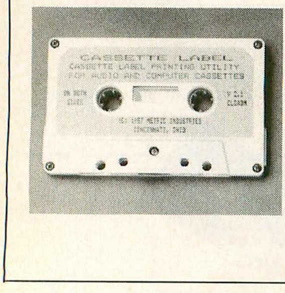
Model 101 Serial to Parallel Printer Interface
★ Works with any COCO
★ Compatible with "Centronics" Parallel Input Printers
★ Just turn the knob to select any one of 6 baud rates 300-9600
★ Comes complete with cables to connect to your printer and computer
★ Can be powered by most printers



Model 104 Deluxe Interface with "Modem Switch"
★ **Same Features as 101 Plus**
★ Built in Serial Port for your Modem or other serial device
★ Switch between Serial Output and Parallel Output
★ Comes with cables to connect to your computer and printer
★ Can be powered by most printers



Model 105 Serial Switch
★ Connects to your COCO to give you 2 switch selectable Serial Ports
★ Comes with a 3 foot cable to connect to your computer
★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
★ Does not require power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Cassette Label Printing Program
★ **New Version 2.1 prints 7 lines** of information on Cassette labels
★ Comes on Tape with instructions to transfer to disk
★ Menu driven, very easy to use
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★ Uses the features of your printer to print standard, expanded, and condensed characters
★ **Automatically Centers Each Line of Text**
★ Allows editing of label before printing
★ Program comes with 24 labels to get you started
★ 16K ECB required

Some of the Printers That Can – Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot – Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List
Model 101 35.95
Model 101P 41.95
Model 104 44.95
Model 104P 51.95
Model 105 14.95
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Pin Feed Cassette Labels:
White 3.00/100
Colors (specify) 3.60/C
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★ **Free Shipping** in the U.S.A. (except AK and HI) on all orders over $50
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Copies Basic/ML/Data Files. CoCo 1,2 or 3. Req. min. 64K Disk System. Disk Only **$24.95**

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Best BBS for CoCo 3. Xmodem Up/Downloading, unlimited menus, login, message base, built-in clock/calendar, execution of external programs. Sysop has full control of user's acess to menus, time on system & remote system access. Full Error Trapping. HyperIO Compatible! Reg. $59.95. Intro. Special $49.95. Min Req CoCo 3, 1 Drive, RS232 Pack.

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A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. Single key execution of Basic/ML programs. This will become your MOST USED program !! CoCo 1,2 or 3. Req. Min. 64K. Disk Only **$24.95**

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The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) and print labels. Its indispensible!! Disk **$19.95** (CoCo 2 version included)

DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text. Double Strike, Border Creation, and multiple label printing. Its a MUST for any user with a disk drive. Supports DMP 105/106/110/120/ 130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included). Only **$19.95**

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COCO-DOS MS-DOS

(Latest Version): Transfer CoCo Disk files to IBM compatible computer and vica-versa. Requires 2-Drive IBM Compatible. Disk **$39.95**

RGB PATCH

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Rainbow Info

How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they *show up* just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

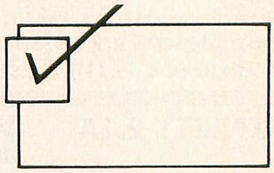
Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

The Seal is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

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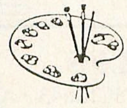

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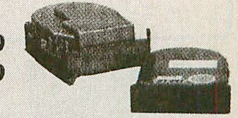

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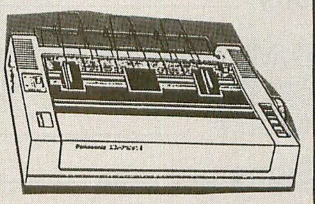

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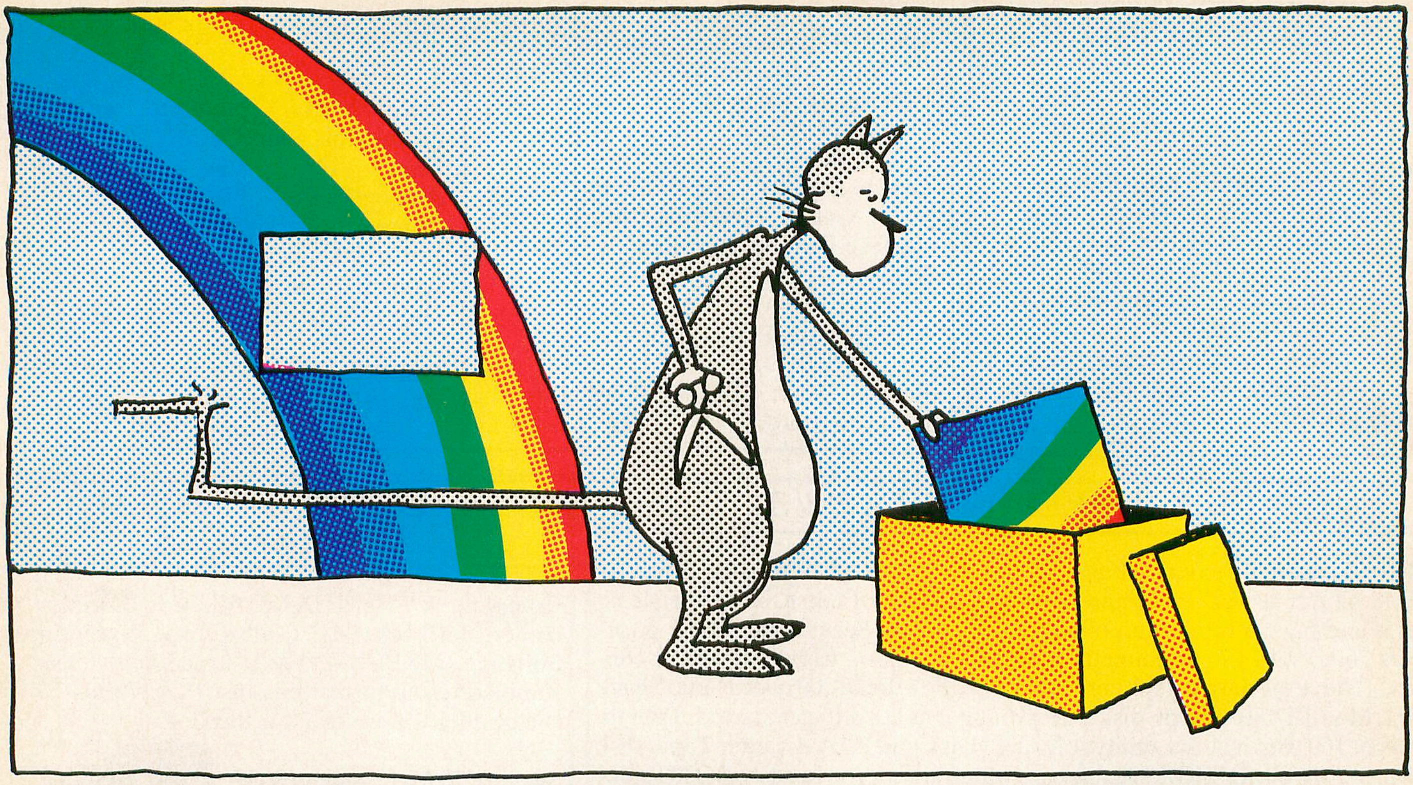

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Max–10 is just that and more. It allows on screen mixing of graphics and text, large headlines, multiple columns and full page preview (with graphics).

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Max–10 Add–ons

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NOTE: Max-10 and CoCo Max Fonts aren't interchangable.

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System Requirements

Max–10 and CoCo Max III Require: any CoCo 3; 1 or more disk drives; joystick or mouse; Radio Shack or Colorware Hi–Res Pack;a video or RGB monitor or a TV.

About CoCo Max III

Whether you doodle for fun or do graphics for a living, **CoCo Max** will amaze you. It's a promise.

Its major features include: Huge picture area (2 full hi–res 320x192 screens). Large editing window. **Zoom** mode for detail work. 28 point and click drawing tools. Shrink and stretch. **Rotation** at any angle (1.5° steps). 512K memory support (all features work with 128K too). Undo (Oops) feature to fix mistakes. **Animation**. Special effects. Color sequencing (8 colors, variable speed). 13 fonts (more available). Each font has 8 sizes and 5 styles for thousands of possible combinations. Translate program to convert most types of pictures. **CoCo Show** "slide show" program. Miniload program to help use pictures with your software. Color editing of patterns. Prints in single or double size. Select 16 of 64 available colors, all 64 colors are shown at once for easy selection. Pull–down menus. **40 paint brush** shapes. Two color lettering. Spray can. Amazing "flowbrush". RGB and composite monitor support. Colors print in 5 shades of gray.

PRINTERS SUPPORTED: EPSON RX,FX,MX,LX AND COMPATIBLES; STAR/GEMINI NX-10,NX-1000; DMP100,105,106,110,120,130,200; OKI 82A,182,192; CGP-220(B&W)

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Text for Graphics

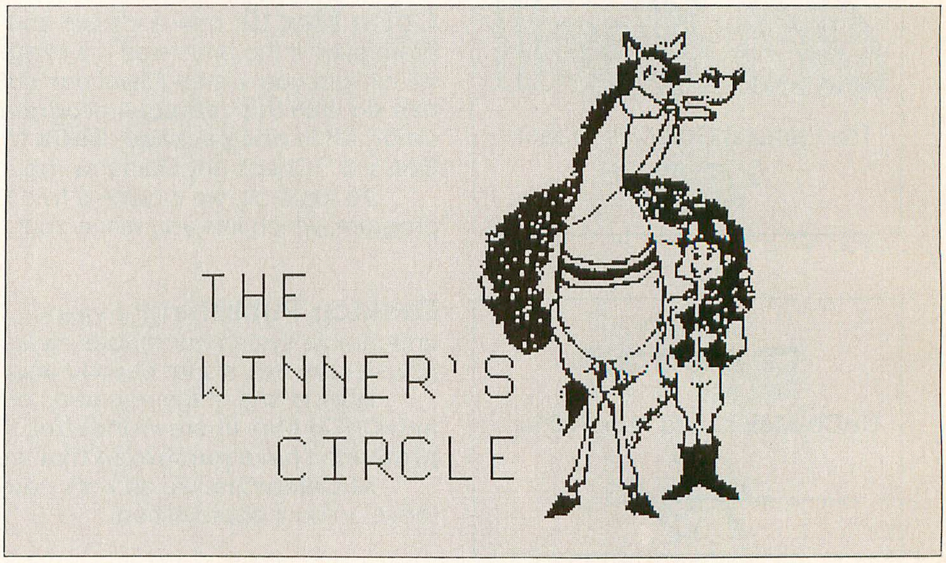
By Jack D. Welsh

Lots of great graphics programs have been published by THE RAINBOW, and many times while using these programs I've wished that I could add text to my creations. I wrote this program to do just that.

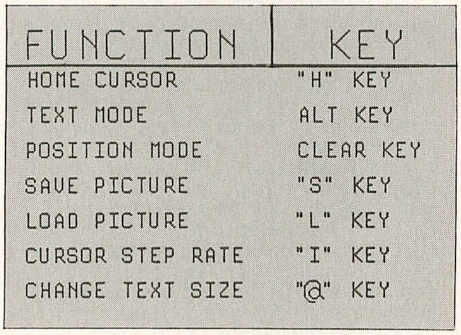
The program will work on any system consisting of at least 32K Extended Color BASIC and a cassette recorder or disk drive system. For printouts you'll need a printer and a screen dump program compatible with your printer. [See Richard Lack's "Get the Picture With Gemini Screen Print" (May 1985, Page 45); Mark Sullins' "Picprt: Good Things Come in All Sizes" (May 1985, Page 72 *for dot-matrix printers*); John Handis' "A Full Page Dump for the DMP-105" (May 1988, Page 92); and David Fitzsimmons' "Penumbral Prints" *for the Gemini 10x* (May 1986, Page 95.] After typing in the listing, save it to a couple of disks so you won't lose your work.

When you run the program, you will see a display of the `PMODE 4` graphics pages. Press SHIFT and CLEAR to clear the screen if it doesn't contain a picture or contains memory garbage. You are now in the Position Mode. In the center of the display you will observe a blinking pixel.

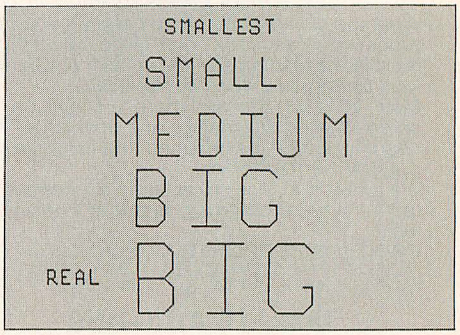
Now press I and then 0. This adjusts the cursor movement to increments of 10. The cursor will move 10 pixels in the direction of the arrow when you press an arrow key. Pressing any other number key in conjunction with the I key will set the cursor movement increment to that number of positions. If the cursor reaches the far right side, it will jump to the far left side if pressed again, and vice versa. On the top and the bottom of thedisplay this does not occur; the cursor merely stops at the top or bottom.



Text was added to this graphics image to make a sign. (Graphics taken from *Art Deli*, courtesy Specialty Projects.)



FUNCTION	KEY
HOME CURSOR	"H" KEY
TEXT MODE	ALT KEY
POSITION MODE	CLEAR KEY
SAVE PICTURE	"S" KEY
LOAD PICTURE	"L" KEY
CURSOR STEP RATE	"I" KEY
CHANGE TEXT SIZE	"@" KEY



You may now use the arrow keys to position the cursor anywhere on the screen you want to place text. Press ALT to jump into the Text Mode, and type your message or desired text. Press @ and then type some more. The @ key switches text sizes up to the fifth size and then starts back over at the smallest size.

To return to the Position Mode, press CLEAR. You can move the cursor to another position on the display to add more text. To load or save a picture, get into the Position Mode and press L or S, respectively.

To place text onto an already saved picture, make sure that the desired picture file is in one of your disk drives. After loading this program press L. Follow the prompts and the picture will pop onto the screen; you can then add text anywhere on the picture you desire.

Jack Welsh is an income tax consultant who learned programming through reading publications and manuals.

After completing your masterpiece, press S. You are prompted to name your creation, and it is saved to disk.

To save or load a file to or from a drive other than the current one, just type the drive number, a colon and the picture filename. It will be loaded or saved to the requested drive when you press ENTER.

The characters used in this program are made up of `DRAW` strings in lines 90 through 620. The variable array `CHAR$(`*x*`)` is used to define the `DRAW` strings, where *x* corresponds to the ASCII value of the key pressed. You can use your imagination to define other pictures or graphic stamps using `DRAW` strings. For instance, change Line 150, which defines the character A, to `150 CHAR$(65) = "R4U4L4D4"`. Now when you press the A key, it will print a box on the screen in any of the five sizes that you choose with the @ key. Some of you with artistic talent can make great use of this feature!

To run the program on a cassette system, change Line 1250 to `1250 CSAVEM PICNAME$,&H600,&H1DFF,0`. Then change `LOADM` in Line 1320 to `CLOADM`.

I have found this program useful to make bulletins, posters, news ads and banners that I then print out, using my favorite screen dump program.

(Questions or comments concerning this program may be addressed to the author at RD#1, Box 112, Conneaut Lake, PA 16316. Please enclose an SASE when requesting a reply.) ☐

240	151	900	226
460	64	1130	62
690	163	END	95

The listing: `GRAFTEXT`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 REM TEXT FOR GRAPHICS
20 REM COPYRIGHT (C) SEPT 1987
30 REM BY JACK D. WELSH
40 REM CONNEAUT LAKE, PA
50 GOSUB 880
60 '** SETS UP MEMORY & DEFINES
ARRAYS & CONSTANTS
70 CLEAR 10000
80 C=2:SCALE=4
90 DIM CHAR$(200)
100 DIM K$(500):K=0
110 R=1
120 INC=1
130 '** DEFINES CHARACTERS IN LI
NES 100 - 570
140 CHAR$(73)="R4L2U8L2R4"
150 CHAR$(65)="U3R4D3U6H2G2D3"
160 CHAR$(66)="U4R3L3U4R3F1D2G1F
1D2G1L3"
170 CHAR$(67)="R3E1G1L3H1U6E1R3F
1"
180 CHAR$(58)="BU1U1BU3U1"
190 CHAR$(68)="U8R3F1D6G1L3"
200 CHAR$(69)="R4L4U4R2L2U4R4"
210 CHAR$(70)="U4R3L3U4R4"
220 CHAR$(71)="R3E1U2L1R1D2G1L3H
1U6E1R3F1"
230 CHAR$(72)="U8D4R4D4U8"
```

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ROBOT WAR

ISSUE #2, AUG. 1982
UFO COVER PT. 1
BIORYTHM
BOMBARDMENT
BLACK JACK
COST OF LIVING
FRENZY
BUSINESS LETTER
QUICK THINK
QUEST INSTRUCTIONS
QUEST FOR LENORE

ISSUE #3, SEPT. 1982
UFO COVER PT.2
BASKETBALL
CHUCKLUCK
SLOT MACHINE
ALPHABETIZER
NFL PREDICTIONS
FLAG CAPTURE
ROBOT BOMBER

ISSUE #4, OCT. 1982
UFO RESCUE
TANK BATTLE
DRIVEWAY
SOUNDS
BALLOON DROP
MIND BOGGLE
COCO-TERRESTRIAL ADV.
CALORIE COUNTER
JACK-O-LANTERN

ISSUE #5, NOV. 1982
CATALOG COVER
BOWLING
PROGRAM INVENTORY
PROMISSORY-LOANS
CHECKBOOK BALANCER
TRIGONOMETRY TUTOR
CONVOY
BAG-IT
SPECTRA SOUND
CONVEYOR BELT

ISSUE #6, DEC. 1982
CHRISTMAS COVER
RAINDROPS
STOCK MARKET
ADVANCE PONG
DESTROY
SOUND ANALYZER
CREATIVITY TEST
VOICE DATA
ML TUTORIAL PT.1
LOONY LANDER

ISSUE #7, JAN. 1983
NEW YEARS COVER
LIST ENHANCER
SUPER PRECISION DIV.
BOMB DIFFUSE
SPACE STATION
ML TUTORIAL PT. 2
SHOOT OUT
FIND UTILITY
CYBORG INS.
CYBORG FACES

ISSUE #8, FEB., 1983
COVER 8
DEFEND
3 DIMENSIONAL MAZE
COCO CONCENTRATION
AUTO LINE NUMBERING
ML TUTORIAL PT.3A
ML TUTORIAL PT.3B
NUCLEAR POWER PLANT
DUAL BARRIER
BRICKS

ISSUE #9, MARCH 1983
TIME MACHINE COVER
TRIG DEMO
PYRAMID OF CHEOPS
PROGRAM PACKER
BUDGET
ELECTRONIC DATE BOOK
ML TUTORIAL PT.4
TAPE DIRECTORY
BLOCK-STIR
COCO ADDING MACHINE

ISSUE #10, APRIL 1983
TENTH COVER
PYRAMID OF DANGER
TYPING TUTOR
ML TUTORIAL PT.5
TINYCALC
STOCK MARKET COMP
YAH-HOO
MISSILE ATTACK
SCREEN PRINT
BRIKPONG

ISSUE #11, MAY 1983
ELEVENTH COVER
ARCHERY
FROG JUMP
ML TUTORIAL PT.6
MLT DICTIONARY
BASIC SPEED UP TOT.
METRIC CONVERTOR
GRAPHIC QUAD ANTENNA
GRAPHICS PROGRAM
CATERPILLAR CAVE

ISSUE #12, JUNE 1983
TWELFTH COVER
SHOOTING GALLERY
BOMB STOPPER
VALLEY BOMBER
STAR FIGHTER
WHEEL OF FORTUNE
ML TUTORIAL PT.7
MERGE UTILITY
RAM TEST
LANDER

ISSUE #13, JULY 1983
THIRTEENTH COVER
FLASH CARD
ICE BLOCK
COSMIC FORTRESS
MAIL LIST
DOLLARS & CENTS
ML TUTORIAL PT.8
SDSK COPY
MUSIC SYNTHESIZER
CRAWLER

ISSUE #14, AUG. 1983
MYSTERY COVER
ROW BOAT
COMPUTER TUTL PT. 1
INDEX DATA BASE
DISK ZAPPER
COCO-MONITOR
COCO-ARTIST
ROBOT COMMAND
TEST SCREEN PRINT
HIGH RESOLUTION TEXT

ISSUE #15, SEPT. 1983
MYSTERY COVER PT.2
GOLD VALUES
TREK INSTRUCTIONS
TREK
HIGH TEXT MODIFICATION
ASTRO DODGE
DR. COCO
PEG JUMP
MORSE CODE
PURGE UTILITY

ISSUE #16, OCT. 1983
MYSTERY COVER
BOPOTRON
DIRECTORY RECALL
VECTOR GRAPHICS INST.
VECTOR GRAPHICS
SKYDIVER
SWERVE AND DODGE
NIMBO BATTLE
TAPE ANALYSIS UTILITY
LIFE GENERATIONS

ISSUE #17, NOV. 1983
THANKSGIVING COVER
3-D TIC-TAC-TOE
INDY 500
COLLEGE ADVENTURE
MEMORY GAME
DUNGEON MASTER
WEATHER FORECASTER
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DRAW

ISSUE #18, DEC. 1983
CHRISTMAS COVER
CLIMBER
GALACTIC CONQUEST
WARLORDS
STATES REVIEW
MATH TUTOR
MACHINE LANGUAGE DATA
PRINTER UTILITY INST.
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MUTANT WAFFLES

ISSUE #19, JAN. 1984
BANNER
PROBE
DISK DIR. PROTECTOR
OPTICAL CONFUSION
WORD PROCESSOR
WORD SEARCH
ASTRONAUT RESCUE
STAR TRAP
PIE CHART
FORCE FIELD

ISSUE #20, FEB. 1984
INTRODUCTION
HINTS FOR YOUR COCO
ESCAPE ADVENTURE
SEEKERS
MASTER BRAIN
LIST CONTROLLER
DISKETTE CERTIFIER
ROM COPY
BASIC RAM
SNAFUS

ISSUE #21, MAR. 1984
BASIC CONVERSIONS
FINANCIAL ADVISE
CASTLE STORM
DOS HEAD CLEANER
COCO TERMINAL
SNAKE CRAWLER
WAR CASTLE
SKY FIRE
EASY BASIC
DOTS 3-D

ISSUE #22, APRIL 1984
HEALTH HINTS
GLIBLIBS
CLOTHER SLITHER
BIBLE 1 & 2
BIBLE 3 & 4
CATCH ALL
INVADER
ALIEN RAID
MOON ROVER
IO ERROR IGNORER

ISSUE #23, MAY 1984
MONEY SAVERS 1 & 2
STOCKS OR BOMBS
WALL AROUND
COCO TECHNICAL LOOK PT.1
NUCLEAR WAR INST.
THERMONUCLEAR WAR
CIRCUIT BREAKER
MOUSE RACES
SUPER SQUEEZE
DATA FALL

ISSUE #24, JUNE 1984
DIR PACK & SORT
BRICK OUT
COCO TECHNICAL LOOK PT. 2
USA SLIDE PUZZLE
51 *24 SCREEN EDITOR
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CITY INVADERS
PRINTER SPOOLER
STEPS
SNAKE

ISSUE #25, JULY 1984
CLOCK
COCO TECHNICAL LOOK PT.3
SKID ROW ADVENTURE
MONEY MAKER
PIN-HEAD CLEANING
LINE EDITOR INST.
LINE EDITOR
BOOMERANG
BUBBLE BUSTER
ROCOCHET

ISSUE #26, AUG. 1984
PEEK POKE & EXECUTE
SAUCER RESCUE
YOUNG TYPER TUTOR
O-TEL-O
OLYMPIC EVENTS
DOUBLE DICE
COCO DATABASE
BATTLE STAR
COCO-PIN BALL
MONTEZUMAS DUNGEONS

ISSUE #27, SEPT. 1984
COCO TO COM 64
GALACTIC SMUGGLER
INDY RACE
ACCOUNT MANAGER
CASSETTE MERGE UTILITY
STRING PACKING TUTORIAL
SPACE DUEL
BUGS
TRAP-BALL
BALLOON FIRE

ISSUE #28, OCT. 1984
HANGING TREE
CHECKERS
FOOTBALL
MORE PEEKS & POKES
SPELLING CHECKER
SOUND DEVELOPMENT
WORD GAME
SCREEN REVERSE
AUTO COPY
RAT ATTACK

ISSUE #29, NOV. 1984
DISK ROLL OUT
ROBOT ON
MULTIPONG
ADVENTURE GENERATOR
QUEST ADVENTURE
QUARTER BOUNCE
DUAL OUTPUT
KEY REPEAT
FULL EDITOR
METEOR

ISSUE #30, DEC. 1984
MATH HELP
ZECTOR ADVENTURE
WORLD CONQUEST
DRAG RACE
MINE FIELD
T-NOTES TUTORIAL
T & D PROGRAM INDEXER
SYSTEM STATUS
ERROR TRAP
DROLL ATTACK

ISSUE #31, JAN. 1985
TREASURES OF BARSOOM
BATTLEGROUND
STRUCT. COMPILED LANG.
MINIATURE GOLF
STAR DUEL
ARITHMETIC FOOTBALL
GRID RUN
SPIRAL ATTACK
FAST SORT
MUNCHMAN

ISSUE #32, FEB. 1985
DR. SIGMUND
ICE WORLD ADVENTURE
LOTTERY ANALYST
BASIC COMPILER
MUSIC CREATOR
MEANIE PATROL
TRI-COLOR CARDS
SHAPE RECOGNITION
DISK BACKUP
SPACE PROTECTOR

ISSUE #33, MAR. 1985
LIGHT CYCLE
PAINT
SKEET SHOOTING
GUITAR NOTES
MI DISK ANALYZER
PERSONAL DIRECTORY
NAUGHA ADVENTURE
EGGS GAME
DISK DIRECTORY PRINT
SPEED KEy

ISSUE #34, APRIL 1985
HOVER TANK
POWER SWORD
TERMITE INVASION
SPELLING CHECKER
DOS BOSS
NINE CARD CHOICE
MUSIC GENERATOR
FYR-DRACA
DRIVE TEST
GRAPHIC TOUR

ISSUE #35, MAY 1985
SELECT A GAME 1
TAPE PROBLEMS
STROLL TRIVIA
SOFTBALL MANAGER
FONTS DEMO
CLOWN DUNK MATH
ALPHA MISSION
DOS ENHANCER
KNOCK OUT
HAUNTED HOUSE

ISSUE #36, JUNE 1985
SELECT A GAME 2
VIDEO COMPUTER
SPEECH SYNTHESIS
SPEECH RECOGNITION
SPACE LAB
AUTO COMMAND
COMPUTER MATCHMAKER
KNIGHT & THE LABYRINTH
STAR SIEGE
TALKING SPELLING QUIZ

ISSUE #37, JULY 1985
CHESS MASTER
BIBLE 5-7
SHIP WREK ADVENTURE
FILE TRANSFER
FOUR IN A ROW
MARSHY
TAPE CONTROLLER
CATACOMB
AUTO TALK
SGR8PAK

ISSUE #38, AUG. 1985
GOLF PAR3
WIZARD ADVENTURE
KITE DESIGN
ROBOTS
GOMOKU
AMULET OF POWER
LINE COPY UTILITY
DISK PLUMBER
SUPER RAM CHECKER
GRAPHIC HORSE RACE

ISSUE #39, SEPT. 1985
DRUNK DRIVING
CAR MANAGER
SQUEEZE PLAY
SUPER BACKUP
RECIPE MACHINE
ANTI-AIRCRAFT
UNREASON ADVENTURE
TALKING ALPHABET
SUPER VADERS
AUTOMATIC EDITOR

ISSUE #40, OCT. 1985
STAR TREK
HAM RADIO LOG
COCO WAR
DISK LABELER
SHIP WAR
ELECTRIC COST
MULTIKEY BUFFER
NUKE AVENGER
CURSOR KING
SAND ROVER

ISSUE #41, NOV. 1985
GRUMPS
DISK DRIVE SPEED TEST
SOLAR CONQUEST
GAS COST
RIME WORLD MISSION
WUMPUS
CHARACTER EDITOR
GRAPHIC TEST
GRAPHIC LOOPY
BOLD PRINT

ISSUE #42, DEC. 1985
HOME PRODUCT EVALUATION
YAHTZEE
DISK UTILITY
MACH II
ELECTRONIC BILLBOARD
CAR CHASE
SUPER MANSION ADVENTURE
SLOT MACHINE GIVE AWAY
TEXT BUFFER
TUNNEL RUN

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BLOWOUT SALE

ISSUE #43, JAN. 1986
DUELING CANNONS
WATER COST
ZIGMA EXPERIMENT
MUSICAL CHORDS
SAFE PASSAGE
PASSWORD SCRAMBLER
GUNFIGHT
KEYPAD ENTRY
STYX GAME
PRINTER DIVERT

ISSUE #44, FEB. 1986
HOME INVENTORY
NINE BALL
PRINTER REVIEW
EXPLORER ADVENTURE
SPANISH LESSONS
CROSS FIRE
RAM SAVER
GRAY LADY
JOYSTICK INPUT
COSMIC SWEEPER

ISSUE #45, MAR. 1986
INCOME PROPERTY MGMT.
ELECTRONIC BILLBOARD 2
MOUNTAIN BATTLE
THE FIGHT
COCO KEENO
HOCKEY
LOGICAL PATTERNS
ON SCALE SCREEN
LIBERTY SHIP
SINGLE STEP RUN

ISSUE #46, APRIL 1986
SPECIAL EVENTS REMINDER
DISK LOCK
SMALL BUSINESS MANAGER
BOMB RUN
TANKS
TAR PITS
BASEBALL
NUMBER RELATIONSHIPS
ROULETTE
GLOBAL EDITOR

ISSUE #47, MAY 1986
CHRISTMAS LIST
BLACK HOLE
PITCHING MANAGER
SYMBOLIC DIFF.
BUG SPRAY
OWARE CAPTURE
EASY GRAPHICS
DESERT JOURNEY
SCREEN CONTROL
FULL ERROR MESSAGE

ISSUE #48, JUNE 1986
CHESTER
TV SCHEDULE
BASE RACE
ROMAN NUMERALS
ASTRO DODGE
HIRED AND FIRED
MULTI COPY
AUTO MATE
SCROLL PROJECT
NOISE GENERATOR

ISSUE #49, JULY 1986
COMPUTER I.O.U.
DISK DISASSEMBLER
BAKCHEK
PACHINKO
STOCK CHARTING
HAUNTED STAIRCASE
CANYON BOMBERS
DRAGONS 1 & 2
GRAPHIC SCROLL ROUTINE
AUTO BORDER

ISSUE #50, AUG. 1986
BUSINESS INVENTORY
D & D ARENA
DISK CLERK
PC SURVEY
TREASURE HUNT
SCREEN GENERATOR
ASTRO SMASH
NFL SCORES
BARN STORMING
SMASH GAME

ISSUE #51, SEPT. 1986
ASSET MANAGER
MONEY CHASE
FISHING CONTEST
RIP OFF
HAND OFF
BUDGET 51
VAN GAR
DOS EMULATOR
MEM DISK
VARIABLE REFERENCE

ISSUE #52, OCT. 1986
ACCOUNTS RECEIVABLE
WORKMATE SERIES
CALENDAR
INVASION
THE TRIP ADVENTURE
FOOT RACE
FLIPPY THE SEAL
SCREEN CALCULATOR
ABLE BUILDERS
SUPER ERROR2

ISSUE #53, NOV. 1986
CORE KILL
LUCKY MONEY
COOKIES ADVENTURE
NICE LIST
SPANISH QUIZZES
PAINT EDITOR
CARVERN CRUISER
SNAP SHOT
MEGA RACE
KICK GUY

ISSUE #54, DEC. 1986
JOB LOG
PEGS
DIGITAL SAMPLING
JUNGLE ADVENTURE
PAINT COCO 3
CONVERT 3
COMPUTER TYPE
PANZER TANKS
MRS PAC
BIG NUM

ISSUE #55, JAN. 1987
GRADE BOOK
MAIL LIST
DOWN HILL
FIRE FOX
JETS CONTROL
GALLOWS
DIR MANAGER
FIRE RUNNER
GRAPHICS BORDER
COSMIC RAYS

ISSUE #56, FEB. 1987
CALENDAR PRINT
CRUSH
GALACTA
OCEAN DIVER
CLUE SUSPECT
WORD EDITOR
ALIEN HUNT
DEMON'S CASTLE
PICTURE DRAW
DIG

ISSUE #57, MAR. 1987
THE BAKERY
ENCHANGED VALLEY ADV.
SAFE KEEPER
WAR 1
BOMB DISABLE
PIANO PLAYER
SPREAD SHEET
SLOT MANEUVER
LIVING MAZE
GEM SEARCH

ISSUE #58, APRIL 1987
ACCOUNTS PAYABLE
PRINTER GRAPHICS
SIMON
PANELING HELPER
MULTI CAKES
CAR RACE
ELECTRONICS I
BATTLE TANK
DISKETTE VERIFY
WEIRDO

ISSUE #59, MAY 1987
GENEOLOGY
HOME PLANT SELECTION
CHECK WRITER
HELIRESCUE
KABOOM
NEW PONG
CROQUET
FUNCTION KEYS
ZOOM
ELECTRONICS 2

ISSUE #60, JUNE 1987
JOB COSTING
LABELS
CATCH A CAKE
COCO MATCH
ROBOTS
STREET RACERS
BOWLING 3
ELECTRONICS 3
GRAFIX
KRON

ISSUE #61, JULY 1987
EZ ORDER
SUBMISSION WRITER
KEYS ADVENTURE
WALLPAPER
CHOPPER COMMAND
UNDERSTANDING OPPOSITES
BIT CODE PLOTTING
ELECTRONICS 4
KING PEDE
RAIDER

ISSUE #62, AUG. 1987
PENSION MANAGEMENT
HERB GROWING
CATOLOGER UTILITY
RAIDERS
ALPHABETIZING
U.F.O.
ELECTRONICS 5
RAMBO ADVENTURE
BLOCKS
MULTI SCREEN CAVES

ISSUE #63, SEPT. 1987
GENEOLOGIST HELPER
SMART COPY
MAINTENANCE REPORTING
COCO3-COCO 2 HELPER
DIRECTORY PICTURE
SUB ATTACK
SAVE THE MAIDEN
CAVIATOR
ELECTRONICS 6
MONKEY SHINE

ISSUE #64, OCT. 1987
GARDEN PLANTS
FORT KNOX
ELECTRONICS FORMULAS
SNAKE IN THE GRASS
CYCLE JUMP
GEOMETRY TUTOR
WIZARD
GAME OF LIFE
ELECTRONICS 7
FLIGHT SIMULATOR

ISSUE #65, NOV. 1987
TAXMAN
DAISY WHEEL PICTURES
CHILDSTONE ADVENTURE
SIR EGGBERT
CROWN QUEST
GYM KHANA
COCO 3 DRAWER
FOOTBALL
ELECTRONICS 8
CHOP

ISSUE #66, DEC. 1987
ONE ROOM ADVENTURE
OS9 TUTORIAL
RIVER CAPTAIN
SOUND EFFECTS
BETTING POOL
ADVANCE
MATH TABLES
ELECTRONICS 9
LOWER TO UPPER
NOIDS

ISSUE #67, JAN. 1988
AUDIO LIBRARY
SAVE THE EARTH
WEIGHTS AND MEASURES
LOW RES PICTURES
WORD COUNTER
BACARAT
BATTLE SHIP
ELECTRONICS 10
TAPE CONVENIENCE
PENQUIN

ISSUE #68, FEB. 1988
COINFILE
WORD COUNTER
SQUIRREL ADVENTURE
AREA CODES
DRAW POKER
TURTLE RACES
ELECTRONICS 11
MULTI SCREEN
CANON PRINT
COCO TENNIS

ISSUE #69, MAR. 1988
POLICE CADET
STAMP COLLECTION
BARRACKS ADVENTURE
CITY/TIME
HI-LO/CRAPS
OLYMPICS
HI-RES CHESS
ELECTRONICS 12
DOUBLE EDITOR
DOUBLE BREAKOUT

ISSUE #70, APRIL 1988
BLOTTO DICE
SUPER COM
GENESIS ADVENTURE
PLANETS
PHK/WAR
SIGN LANGUAGE
ARX SHOOTOUT
ELECTRONICS 13
MAGIC KEY
SNAP PRINT

ISSUE #71, MAY 1988
SUPER LOTTO
ROBOT ADVENTURE
MAZE
YAHTZEE 3
PHASER
SHAPES & PLATES
STAR WARS
ELECTRONICS 14
PRINTER CONTROL
MAZE 2

ISSUE #72, JUNE 1988
FLYING OBJECTS
THREE STOOGES
HOSTAGE
PROGRAM TRIO
GLADIATOR
US & CAN QUIZ
JEOPARDY
ELECTRONICS 15
COCO 3 PRINT
CTTY COMMUNICATOR

ISSUE #73, JULY 1988
FOREIGN OBJECTS
CHESS FUNDAMENTALS
WATERFOWL QUIZ
WHAMMY 3
ADVENTURE TUTORIAL
CIRCLE 3
EDUCATIONAL TRIO
WRITE-UP EDITOR
PICTURE PACKER
AIR ATTACK

ISSUE #74, AUGUST 1988
VIDEO CATALOG 3
ONE EYE WILLIE
JAVA
GAME TRIO
CRIONAUT WARRIOR
ENVELOPE PRINT
RAM DRIVE 3
MODE 2 UTILITY
XMODEM TRANSFER
CAVE II

ISSUE #75, SEPT. 1988
DRACULA HUNT
HELP TRIO
SHOWDOWN DICE
TARZAR 1 ADVENTURE
ARAKNON
CASHFLOW REPORTING
GRAPHIC LETTER
GRAPHIC EDITOR
ADDRESS BOOK
SQUARES

ISSUE #76, OCT. 1988
SUPER BLITZ 3
CHAMBERS
TRIO RACE
EARTH TROOPER
STARGATE
BOWLING SCORE KEEP
JOYSTICK TO KEYBOARD
KEYBOARD TO JOYSTICK
DISK TUTORIAL
SAILORMAN

ISSUE #77, NOV. 1988
POLICE CADET #2
STARSHIP SHOWDOWN
MUSIC COMPOSER
COUPONS/REBATES
PROGRAM LIBRARY
BOY SCOUT SEMAFORE
HOUSEHOLD CHORES
MAXOMAR ADVENTURE
CHUCK LUCK 3
BUZZARD BATE

ISSUE #78, DEC. 1988
POLICE CADET #3
TANK TURRET
WAR OF THE WORLDS
SPINSTER CAFE
COCO SIZE
SIGN MAKER
LEGAL DEDUCTIONS
BOOKKEEPING
CAR LEASE 3
WAREHOUSE MUTANTS

ISSUE #79, JAN. 1989
POLICE CADET #4
POKER 3
TILER TEX
BATTLE
INSIDE THE COCO
COCO B.B.S.
HOT DIRECTORY
VCR TUTORIAL
PRINTER CONTROLLER
THE KING

ISSUE #80, FEB, 1989
SCRABBLE
SPELLING CHECKER
SANDSTONE
FAMILY FEUD
HARNESS RACING
MINI GOLF 3
ULTIMATE TERMINAL 3
NETWORK TUTORIAL
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7 15 23 31 39 47 55 63 71 79
8 16 24 32 40 48 56 64 72 80

PLEASE CIRCLE
TAPE or DISK

```
240 CHAR$(74)="H1U2D2F1R2E1U7L2R
4"
250 CHAR$(75)="U4R1F4H4E4G4L1U4"
260 CHAR$(76)="R4L4U8"
270 CHAR$(77)="U8F2E2D8"
280 CHAR$(78)="U8D1F4D3U8"
290 CHAR$(79)="R3E1U6H1L3G1D6F1"
300 CHAR$(80)="U8R3F1D3G1L3"
310 CHAR$(81)="R2F1H1R1E1U6H1L3G
1D6"
320 CHAR$(82)="U8R3F1D3G1L3R2F3"
330 CHAR$(83)="H1U1D1F1R3E1U2H1L
3H1U2E1R3F1D1"
340 CHAR$(84)="BR2U8L2R4"
350 CHAR$(85)="H1U7D7F1R2E1U7"
360 CHAR$(86)="BR2H2U6D6F2E2U6"
370 CHAR$(87)="U8D8E2F2U8"
380 CHAR$(88)="U2E2H2U2D2F4D2U2H
2E2U2"
390 CHAR$(89)="BR2U4H2U2D2F2E2U2
"
400 CHAR$(90)="R4L4U2E4U2L4"
410 CHAR$(48)="H2U4E2R1F2G4E4D4G
2L1"
420 CHAR$(49)="R2U8G2E2D8R2"
430 CHAR$(50)="R4L4U2E1R2E1U3H1L
2G1"
440 CHAR$(51)="H1F1R2E1U2H1L1R1E
1U2H1L2G1"
450 CHAR$(52)="U4L2U4D4R5L3U3"
460 CHAR$(53)="H1U1D1F1R2E1U2H1L
3U4R4"
470 CHAR$(54)="H1U2D2F1R2E1U2H1L
2G1U4E1R2F1"
480 CHAR$(55)="U2E4U2L4D1"
490 CHAR$(56)="H1U2E1R2L2H1U2E1R
2F1D2G1F1D2G1L2"
500 X=0:Y=30
510 CHAR$(57)="BU4R4L4U4R4D7G1L2
H1"
520 CHAR$(63)="BR2U1BU2U1R1E1U2H
1L3G1D2"
530 CHAR$(46)="R1U1L1D1"
540 CHAR$(44)="R1D2L1R1U2L1"
550 CHAR$(39)="BR1BU5U2H1"
560 CHAR$(36)="H1F1R3E1U2H1L3H1U
2E1R3F1H1L1U1D10"
570 CHAR$(42)="E5BD5H5"
580 CHAR$(61)="BU2R5BU2L5R5"
590 CHAR$(34)="BU6U2BR2D2"
600 CHAR$(47)="BU1E5"
610 CHAR$(33)="BR1U1BU2U5"
620 CHAR$(45)="BU3R3"
630 X=128:Y=96
640 GOTO 980
650 '** GETS INPUT AND DRAWS TEX
T IN LINES 600-830
660 B$=INKEY$:IF B$="" THEN 660
670 IF B$=CHR$(12) THEN PMODE 4,
1:SCREEN 1,1: GOTO 950
680 IF ASC(B$)=64 THEN SCALE=SCA
LE+4:GOTO 660
690 IF B$=CHR$(92) THEN PCLS5
700 IF SCALE>20 THEN SCALE=4
710 IF B$=CHR$(92) THEN PCLS5:X=
-8:Y=30
720 IF ASC(B$)=8 THEN GOTO 900
730 N=ASC(B$)
740 IF B$=CHR$(13) THEN X=0:Y=Y+
SCALE*4:GOTO 660
750 IF X>(255-(SCALE*2)) THEN X=
0:Y=Y+(SCALE*4)
760 IF Y>192 THEN Y=192
770 X$="BM"+STR$(X)+","+STR$(Y)
780 S$="S"+STR$(SCALE)+"C"+STR$(
C)+";"
790 K$(K)=B$
800 A$=X$+CHAR$(N)
810 DRAW S$+A$
820 K=K+1
830 IF TRIG=1 THEN K=K-1:C=2:TRI
G=0:X=X-(SCALE*2)
840 X=X+(SCALE*2)
850 C=2
860 GOTO 660
870 '** SETS UP SCREEN MODE
880 PMODE 4,1:SCREEN 1,1
890 RETURN
900 ' HANDLES BACKSPACE ROUTINE
WHEN GOING FROM A LINE TO LINE A
BOVE.
910 IF K<1 THEN K=0 :GOTO 660
920 IF X<5 THEN X=INT(255/(SCALE
*2))*(SCALE*2):Y=Y-(SCALE*4)
930 K=K-1:B$=K$(K):TRIG=1:C=5:X=
X-(SCALE*2):GOTO 680
940 '** BEGINNING OF CODE TO POS
ITION THE CURSOR
950 IF PPOINT(X,Y)=2 THEN GOTO 9
90
960 D$=INKEY$
970 IF PPOINT(X,Y)<>5 THEN GOTO
1010
980 PRESET(X,Y)
990 FOR CC=1 TO 50:NEXT
1000 PSET(X,Y)
1010 IF D$="I" THEN GOTO 1160
1020 IF D$="S" THEN GOSUB 1220
1030 IF D$="L" THEN GOSUB 1290
1040 IF D$=CHR$(64) THEN SCALE=4
: GOTO 660
1050 IF D$=CHR$(92) THEN PCLS5
1060 IF D$=CHR$(72) THEN X=0:Y=0
1070 IF D$=CHR$(9) THEN X=X+INC:
GOTO 960
1080 IF D$=CHR$(8) THEN X=X-INC
1090 IF X>255 THEN X=0
1100 IF X<0 THEN X=255
1110 IF D$=CHR$(10) THEN Y=Y+INC
1120 IF D$=CHR$(94) THEN Y=Y-INC
1130 IF Y>192 THEN Y=192
1140 IF Y<0 THEN Y=0
1150 GOTO 950
1160 C$=INKEY$:IF C$="" THEN 116
0
1170 INC=VAL(C$)
1180 IF INC<0 OR INC>9 THEN GOTO
 1160
1190 IF INK=0 THEN INC=10
1200 GOTO 950
1210 '** ROUTINE TO SAVE A PICTU
RE
1220 CLS
1230 PRINT @32*8+5,"PICTURE NAME
 > ";
1240 LINE INPUT PICNAME$
1250 SAVEM PICNAME$,&H0E00,&H25F
F,0.
1260 PMODE 4,1:SCREEN 1,1
1270 RETURN
1280 '** ROUTINE TO LOAD A PICTU
RE
1290 CLS:PRINT @32*8+5,"NAME OF
PICTURE TO LOAD"
1300 PRINT@32*9+10,"> ";
1310 LINE INPUT PICNAME$
1320 LOADM PICNAME$
1330 PMODE 4,1:SCREEN 1,1
1340 RETURN
```

VIP Writer III Ver. 2 *Cat. #90-908

VIP Writer III offers screen widths of 32, 40, 64 & 80 - all with 24 lines and actual lower case letters using the CoCo 3's hardware display. It runs at double clock speed and has 4-color menus making VIP Writer III FAST and EASY to use! You can choose foreground, background, hilite and cursor colors from up to 64 hues. Color can be turned ON or OFF for the best possible display using a monochrome monitor or TV set. VIP Writer III has a context sensitive help facility to display command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

MORE TOTAL TEXT STORAGE

VIP Writer III has 106K total text storage in a 128K CoCo 3 (495K in 512K). VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

> *"In the beginning there was VIP Writer and users saw that it was good, But it's not the best anymore. There's a new word processor to claim the crown... "* –RAINBOW SEPT. 1988

POWERFUL EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

> *"VIP Writer III, Version 2, has almost every conceivable feature one could ask for... you'll find VIP Writer's 125 page tutorial a real prize and professionally packaged. VIP Writer III ...way ahead of whatever's in second place."* –RAINBOW APRIL'89

AUTOMATIC TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE !

PREVIEW PRINT FORMAT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

PRINTING VERSATILITY

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

BUILT IN PRINT SPOOLING

VIP Writer III has a print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job! Some word processors DO NOT include this feature!

50,000 WORD SPELLING CHECKER

VIP Writer III includes VIP Speller (not FREEWARE) to check your text for misspelled words It has a 50,000 (not 20,000) word dictionary that can be added to or edited.

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VIP Writer III includes VIP Speller 1.1. **DISK $79.95**

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For VIP Library shipping please add $4 USA. $5 Canada. $10 Foreign.

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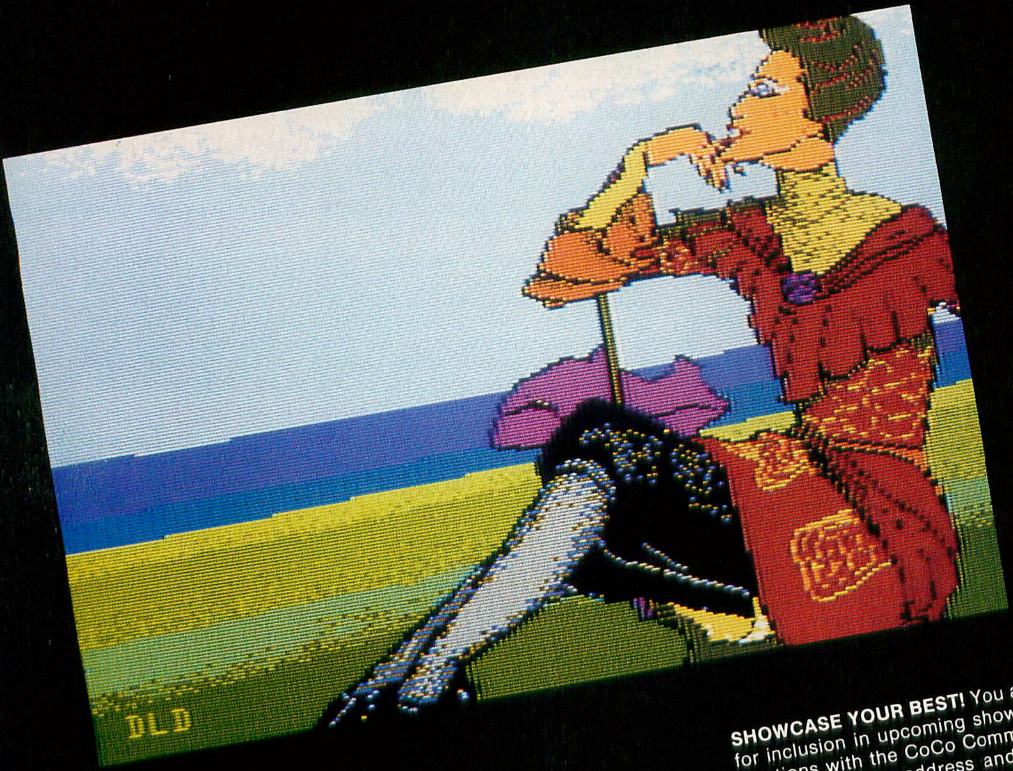
All products run under RSDOS and are not copy protected.

CoCo Gallery



1st Prize

Lady in the Grass
David Dawson

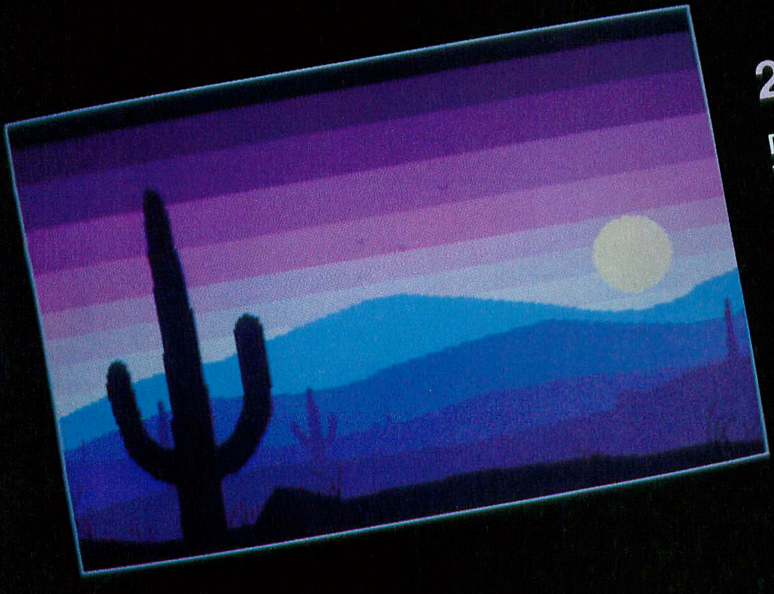
This picture, created with a graphics editor of David's own design, captures in vivid colors, a lady relaxing near a shoreline. David lives in Vermillion, South Dakota.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

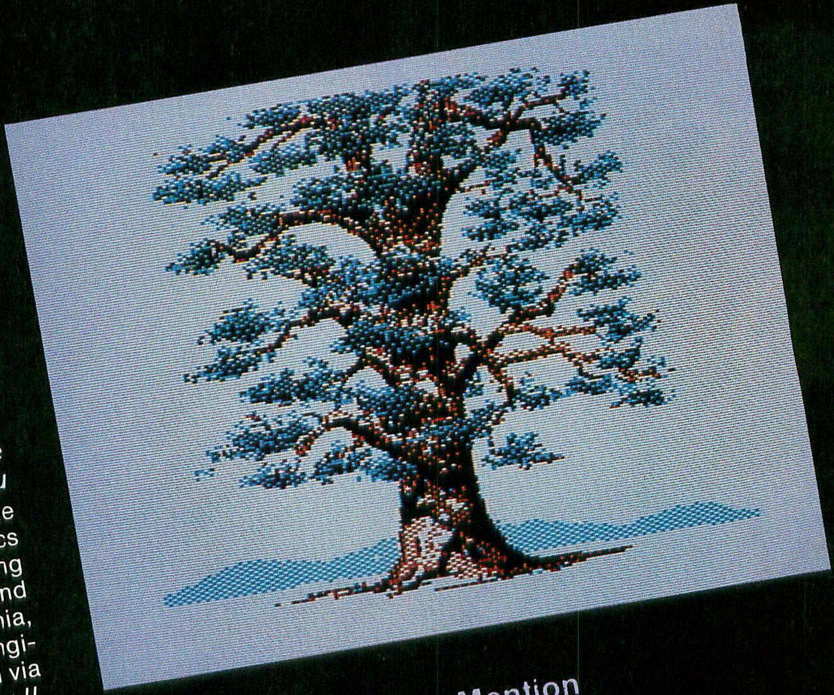
Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.



2nd Prize

Desert
Tom LoConte

Another day in the desert comes to a close. Tom, of Rocky Point, New York, has an associate degree in computer science. His hobbies include science fiction and programming on the CoCo 3. Tom wrote the program for this picture.



1st Prize
CoCo 1 and 2

Tree

Michael Y. Chu

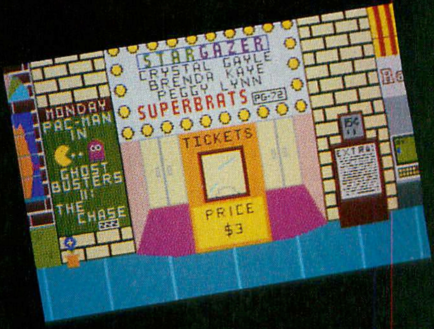
Michael takes advantage of the available patterns in his graphics package to achieve interesting results. He has two children and lives in Monclair, California, where he works as a civil engineer. This view was drawn via *CoCo Max II*.

Honorable Mention

At the Movies

Charles F. Hulen

This program was written in BASIC, plotted on graph paper and designed using the x, y number block method. From Lawrenceburg, Tennessee, Charles enjoys all types of music, and less than a year ago started his own software company. Remember to save the aisle seats.


STARGAZER
CRYSTAL GAYLE
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PEGGY LYNN
SUPERBRATS
PG-72
MONDAY
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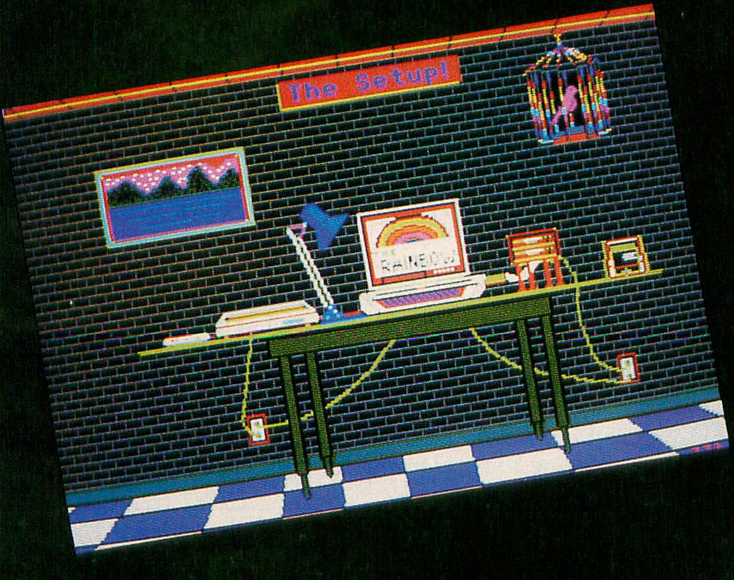
GHOST BUSTERS II
THE CHASE
TICKETS
PRICE $3
EXTRA


The Setup!
RAINBOW

3rd Prize

Setup

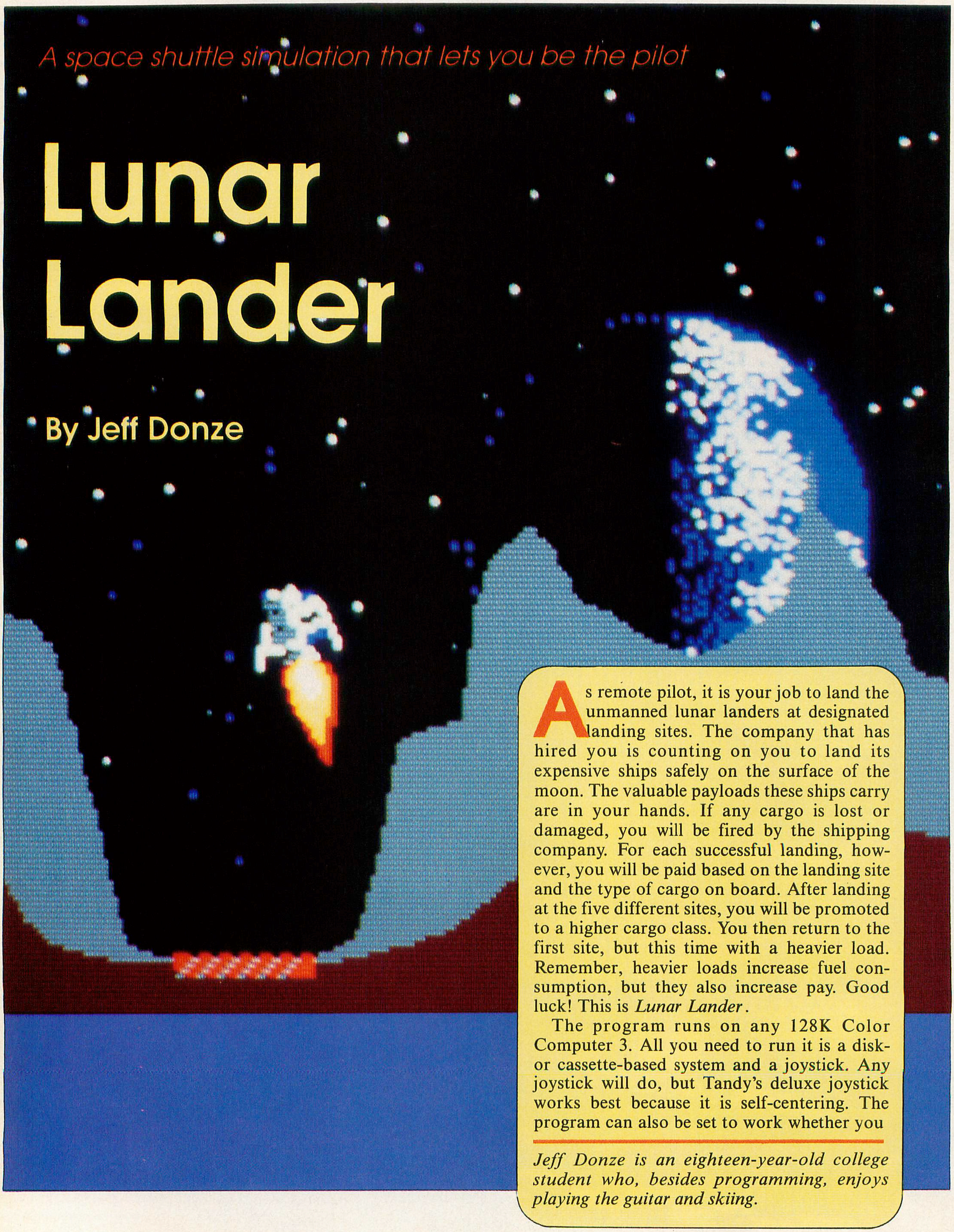
Thomas Rawlinson

Thomas resides in Toronto, Ontario where he owns a landscape design/construction company. A CoCo enthusiast for over four years, he used *the Rat* to illustrate a work station.

A space shuttle simulation that lets you be the pilot

Lunar Lander

By Jeff Donze



As remote pilot, it is your job to land the unmanned lunar landers at designated landing sites. The company that has hired you is counting on you to land its expensive ships safely on the surface of the moon. The valuable payloads these ships carry are in your hands. If any cargo is lost or damaged, you will be fired by the shipping company. For each successful landing, however, you will be paid based on the landing site and the type of cargo on board. After landing at the five different sites, you will be promoted to a higher cargo class. You then return to the first site, but this time with a heavier load. Remember, heavier loads increase fuel consumption, but they also increase pay. Good luck! This is *Lunar Lander*.

The program runs on any 128K Color Computer 3. All you need to run it is a disk- or cassette-based system and a joystick. Any joystick will do, but Tandy's deluxe joystick works best because it is self-centering. The program can also be set to work whether you

---

Jeff Donze is an eighteen-year-old college student who, besides programming, enjoys playing the guitar and skiing.

Telewriter-128™

the Color Computer 3 Word Processor

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If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

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(Add $2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and $41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing **1-800-321-3133.**

Ask for: **Telewriter-128** (disk) . . . cat #90-0909
Telewriter-64 (disk) . . . . cat #90-0254
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26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The On-line OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count, free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the Features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

are using a TV or an RGB monitor. Before starting, read the appropriate section below on loading.

Tape Owners

As I explain how to save, load and modify this program, I will assume you have read chapters 13 and 14 in your *Color Computer 3 Extended BASIC* manual. You need to know how to `CLOAD`, `CSAVE`, `SKIPF` and `EDIT`.

If you will be typing in these programs, you should have an extra tape handy to make backup saves. I'll refer to this second tape as the backup tape and the other as the main tape. If you don't subscribe to RAINBOW ON TAPE, you will have to type in listings 1 and 2 (`LANDERGG` and `LANDER`) and remove any errors. Do not run them, but save them in order on the backup tape. If you have an RGB monitor, change `CM$` to `RG$` in Line 230 of `LANDER`. This tells the program that you have an RGB monitor. You are now done with the backup tape. Put it in a safe place and keep it in case something happens to the main tape. Next, rewind the main tape and type `CLOAD"LANDERGG"`. Type `SKIPF` to skip past Listing 2, `LANDER` — this is important. Press Play and Record, then, type `RUN`.

`LANDERGG` then saves two binary files containing graphics on the tape. It will take about 15 minutes to run and two minutes to save, but you only have to run it once. Rewind the tape and type `CLOAD"LANDER"` and then type `RUN`.

Disk Owners

Start by formatting a new disk using the `DSKINI` command. That is, put a blank disk in Drive 0 and type `DSKINI0`. Type in Listing 1, `LANDERGG`, and remove any errors. (Do not run it yet.) Edit lines 980 and 1000; change `CSAVEM` to `SAVEM`. Now save it on your new disk. If you have typed the program, you will want to save it on another disk as a backup. Next, type in Listing 2, `LANDER`. Change `CLOADM` in lines 70 and 80 to `LOADM`. If you have an RGB monitor, change `CM$` in Line 230 to `RG$`. This tells the program that you have an RGB monitor. Save it on the new disk. Again, if you have typed in this program be sure to save it on another disk with `LANDERGG` as a backup. Put the new disk back in the drive and load and run `LANDERGG`. This is the graphics generator; it saves two binary files containing graphics to the disk. It will take about 15 minutes to run, but it only has to be run once. All you have to do now is type `RUN"LANDER"`.

After you run `LANDER`, the program loads the two binary files. Disk systems load in only a few seconds, but tapes take about two minutes to load. The screen clears to black before you see the title screen. Press the joystick button and there is a short paragraph much like one at the start of this article. Press the button again to start the game.

> ***"As a remote pilot, it is your job to land the unmanned lunar landers at designated landing sites."***

The screen clears to black for about 10 seconds while the computer draws the first landing site. If your joystick is not self-centering, push it slightly toward the middle. If it is down too far the ship's jet comes on, and it will go too high, ending the game. At the top of the game screen the computer shows the Landing Site number and the Cargo Class number. On the right side of the screen is a red bar, the Fuel Level indicator. At this point, you should see the craft floating across the top of the screen under the words "Landing Site." Now is a good time to practice controlling the ship's angle by moving the stick horizontally, that is, to the left and right.

Notice that the joystick does not work like an Atari. If you move it to the far left, the ship's jet points all the way to the left. It works the same to the right, but if you put the stick in the middle, the ship's jet points down. Move the stick slightly to one side, and the ship will turn to that side proportionally. Pulling the stick down controls the ship's engine.

When the game starts the ship is in orbit, and you must slow it down to make it fall. To do this, wait until the ship is on the left half of the screen and pull the joystick all the way to the bottom-right. Stop thrusting when you see that the ship is falling. Now the rest is maneuvering. Try to get the ship so it is slowly falling straight down directly over the landing pad. While guiding your ship use less thrust than you think you need. Using too much thrust causes the ship to shoot off too fast.

You can only land the ship on the landing pad shown. The landing pad is the gray and maroon rectangle. To land successfully, the ship must be all the way on the pad, not hanging off one side. The ship must also be level. If the ship touches while it is tilted at all it will crash. Finally, the ship must go very slow. Almost any left to right motion will cause a crash. Accidents will also occur if the ship is descending too fast when it touches down.

If you have a centering joystick like Tandy's, you may want to set the centering controls on the bottom to X-Free and Y-Centering. This way the stick moves freely from left to right, but snaps back if you pull it down. If you are using a cassette you should know that pressing the Reset button will destroy some of the graphics, and the program will try to reload the two graphics files. If you do press the Reset button be sure and rewind the tape before running the program.

For those of you who have some experience programing on the CoCo 3, there are two parts of this program. The first part changes one of the `HPUT` options to allow you to `XOR` graphics to the screen. The second doubles the buffer space used for `HPUT` and `HGET`.

The first change is simple. It changes the `NOT` option for `HPUT` to `XOR`. `XOR` is used to save time by making the program run faster. When you put a picture on the screen using `XOR`, you can erase it by putting the same picture using `XOR` again. One disadvantage is that the background for the picture and the screen must be zero, or the picture's colors will not be correct.

This second change is more complicated. I would not reccomend it for beginners. However, if you have experience with CoCo 3 graphics you might like to expand the Hi-Res `GET/PUT` buffer. Doing so allows you to have a greater variety of graphics in your program. The book tells us that we have 7932 bytes to use for graphics storage. If you look at the memory map on Page 311 you will see Hi-Res `GET/PUT` buffer memory. A few lines down you will see an area marked "Unused" by BASIC. These two areas are the same size. If we tell it to, we can have the CoCo use the unused area as a secondary buffer. The number that tells the CoCo what memory to use for buffers is at $E0D4. The dollar sign means hexadecimal; you can use hex in BASIC by replacing `$` with `&H`. The normal value at this location is $34.

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- G1 - 12 Basic Graphic Programs
- G2 - 12 Basic Graphic Programs
- G3 - 9 Coco 3 Graphic Programs
- G4 - 22 Coco Max Pictures
- G5 - 22 Coco Max Pictures
- G6 - 22 Coco Max Pictures
- G7 - 15 Coco Max Pictures
- G8 - 22 .Bin Pictures
- G9 - 22 .Bin Pictures
- G10 - 14 Large .Bin Pictures
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- GA4 - Abm, Cartel, Subchase, Trek, +
- GA5 - Blackjack, Laser, Raceway, Utopian, +
- GA6 - Kings, Navyguns, Poolgame, Subship, +
- GA7 - Connect4, F-16, Life, Mazeland, +
- GA8 - Chute, Football, Othello, Slither, +
- GA9 - Civilwar, Flight, Prix, Stock, +
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M1 M2 M3 M4 M5 M6 M7
A1 A2
T1 T2 T3

G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14

E1 E2 E3 E4
H1 H2 H3 H4

U1 U2 U3 U4 U5 U6 U7 U8

GA1 GA2 GA3 GA4 GA5 GA6 GA7 GA8 GA9 GA10 GA11

PLEASE CIRCLE
TAPE DISK

Please turn to pages 22 and 23 for our Subscription Software!

The number for the secondary buffer is $37. To select the secondary buffer use this command:

```
POKE &HE0D4,&H37
```

To go back to the normal buffer use:

```
POKE &HE0D4,&H34
```

Whichever buffer you select will be used for HBUFF, HGET and HPUT. To trick the CoCo into using the secondary buffer you must mark it as free. To do this use:

```
LPOKE &H6E000,255:LPOKE &H6E001,
255
```

You can also mark the normal buffer free with:

```
LPOKE &H68000,255:LPOKE &H68001,
255
```

When designing your own program using this technique you should keep the following things in mind. At the start of your program mark both buffers as free. This will eliminate redefining errors. Select one of the buffers and do all the HBUFF's for that buffer. Then select the other buffer, and do the HBUFF's for that buffer. As long as you always use the same buffer sizes, the graphics in the buffer will not be affected. With all the buffers defined with HBUFF, you can now GET and PUT graphics to or from either buffer space depending on which one you select. Avoid pressing the Reset button. This destroys some of the graphics in the normal buffer space. If your program only puts graphics on the screen, you may want to divide the program into two parts. The first part draws graphics and HGET's them, the second part uses the graphics from the first part.

This is the way *Lunar Lander* works. Redefine buffers with HBUFF at the start of each part. This way you only need to run the first part once. CoCos with 512K can also use numbers from 0 to $2F for even more buffer space. Remember, each area must be marked free and needs its own HBUFF's. To save the graphics buffers, examine lines 880 through 1020 of LANDERGG, and to load, look at lines 70 and 80 of LANDER. When saving and loading, the poke to $FFA2 intrudes on BASIC's memory. To be safe, always load and save in the first few lines, and always type POKE &HFFA2, &H3A before going on to the rest of the program. If you don't, some of your program will disappear.

(Questions or comments concerning this article may be directed to the author at 7341 Holly Park Drive, Concord, OH 44060. Please include an SASE when requesting a reply). ☐

Editor's Note: For your convenience, the two binary files generated by Listing 1, LANDERGG, *are included on both RAINBOW ON TAPE and DISK. To execute the program, simply load and run LANDER.*

210	254
360	202
540	85
730	139
910	139
END	42

Listing 1: LANDERGG

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '''''''''''''''''''''''''''''
''''''
20 ' Lunar Lander Graphics Gener
ator '
30 '         By: Jeff Donze
     '
40 '         Copyright 1988
     '
50 '''''''''''''''''''''''''''''
''''''
60 ON BRK GOTO 1020
70 POKE 65497,0
80 HSCREEN 2
90 R=RND(-98765)
100 POKE &HE0D4,&H34
110 PI=3.14159
120 DEF FNR(X)=X/57.29577951
130 DEF FNS(X)=ATN(X/SQR(-X*X+1)
)
140 DEF FNE(X)=INT(X/2)*2
150 YO=15:XO=40:AO=-90
160 FOR AN=0 TO 10:AO=AO+15
170 YL=200:XL=200:RESTORE:HBUFF
AN+1,684
180 READ A$:IF A$="*" THEN 450
190 IF A$="C" THEN READ C:HCOLOR
 C:GOTO 180
200 IF A$="L" THEN READ X1,Y1:GO
SUB 1030:READ X2,Y2:GOSUB 1040:H
LINE(X1,Y1)-(X2,Y2),PSET ELSE 23
0
210 IF X2<XL THEN XL=X2
220 IF Y2<YL THEN YL=Y2
230 IF A$="P" THEN READ X1,Y1,PC
,BC:GOSUB 1030:HPAINT(X1,Y1),PC,
BC
240 IF A$="-" THEN READ X1,Y1:GO
SUB 1030:HLINE-(X1,Y1),PSET
250 IF X1<XL THEN XL=X1
260 IF Y1<YL THEN YL=Y1
270 GOTO 180
280 DATA C,1,L,0,13,3,6,L,1,10,9
,11,L,9,13,9,7,L,9,8,14,8
290 DATA L,13,4,15,13,L,13,4,11,
4,-,11,5,-,13,5
300 DATA L,8,4,8,5,-,9,5,-,9,4,-
,8,4
310 DATA L,10,3,10,2,-,8,2,-,8,1
,-,9,1,-,9,2
320 DATA L,6,1,5,1,-,5,0,-,4,0
330 DATA C,2,L,11,13,10,12,L,8,6
,9,6,-,10,5,-,10,4,-,9,3,-,8,3
340 DATA C,3,L,5,10,8,10,L,3,9,8
,9,L,3,8,8,8,L,4,7,8,7,L,4,6,7,6
350 DATA L,4,5,7,5,L,4,4,7,4,L,4
,3,7,3,L,4,2,7,2,L,4,1,4,1
360 DATA L,8,13,5,13,-,6,12,-,8,
```

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```
12,L,10,13,10.13,C,4
370 DATA L,13,3,11,3,-,11,2,-,12
,2,-,12,3
380 DATA L,10,11,10,9,-,13,9,-,1
3,10,-,10,10
390 DATA C,8,L,6,14,4,16,-,4,20,
-,8,32,-,12,20,-,12,16,-,10,14,-
,6,14
400 DATA P,8,18,8,8
410 DATA C,9,L,7,14,5,16,-,5,20,
-,8,28,-,11,20,-,11,16,-,9,14,-,
7,14,P,8,18,9,9
420 DATA C,10,L,8,14,6,16,-,6,19
,-,8,25,-,10,19,-,10,16,-,8,14,P
,8,18,10,10
430 DATA C,11,L,8,15,7,16,-,7,19
,-,8,20,-,9,19,-,9,16,-,8,15,P,8
,18,11,11
440 DATA L,8,15,8,20,*
450 HGET(FNE(XL),YL)-(FNE(XL)+35
,YL+35),AN+1
460 HCLS:NEXT AN
470 ' Saturn
480 HCLS
490 POKE &HE0D4,&H37:LPOKE &H6E0
00,&HFF:LPOKE&H6E001,&HFF
500 HBUFF 1,1620
510 C(1,1)=0:C(1,2)=7:C(2,1)=7:C
(2,2)=6
520 FOR RA=PI/2 TO 3*PI/2 STEP P
I/90
530 IF RND(0)>.8 THEN HSET(100+C
OS(RA)*19,100+SIN(RA)*17,7)
540 NEXT RA
550 FOR R=6 TO 19 STEP 1.1:H=17
560 F=(R-5)/7:W=INT(F):F=F-W
570 FOR RA=PI/2 TO 3*PI/2 STEP P
I/90
580 HSET (100-COS(RA)*R,100+SIN(
RA)*H,C(W+1,1-(RND(0)<F)))
590 NEXT RA,R
600 A=0:FOR R=34 TO 42
610 HCIRCLE (100,100),R,6,.14,.8
5-A,.68
620 A=A+.0015:NEXT R
630 HCIRCLE (100,100),R,7,.15,.8
5-A,.69
640 HDRAW "C0BM82,95NR5DNR5DR5"
650 HGET (56,82)-(144,117),1
660 ' Mars
670 HCLS:HBUFF 2,1800
680 FOR RA=PI/2 TO 3*PI/2 STEP P
I/90
690 IF RND(0)>.7 THEN HSET(160+C
OS(RA)*29,100+SIN(RA)*29,7)
700 NEXT RA:FOR R=2 TO 29
710 F=R/15:W=INT(F):F=F-W
720 FOR RA=PI/2 TO 3*PI/2 STEP P
I/110
730 HSET (160-COS(RA)*R,100+SIN(
RA)*29,C(W+1,1-(RND(0)<F)))
740 NEXT RA,R:HGET (130,70)-(188
,129),2
750 ' Earth
760 HCLS:HBUFF 3,3200
770 FOR C=3 TO 1 STEP -1:READ D$
,E$,R1,R2
780 HCIRCLE (300,100),41,C:HDRAW
 "BM300,60XD$;BM300,140XE$;"
790 HCIRCLE (285,90),R1,C,1.1:HP
AINT (285,90),C,C
800 HCIRCLE (270,111),R2,C,.9:HP
AINT (270,111),C,C
810 HPAINT (298,65),C,C:HPAINT (
298,138),C,C:NEXT C
820 HCIRCLE (300,100),41,0
830 DATA "C3D18L15M-10,-4H4","U2
0L18M-10,+6",14,16
840 DATA "C2D15L15M-8,-3H2","U18
L16M-11,+6",12,14
850 DATA "C1D13L14M-8,-5","U15L1
5M-10,+5",10,12
860 C(1,1)=0:C(1,2)=5:C(2,1)=5:C
(2,2)=4
870 FOR RA=PI/2 TO 3*PI/2 STEP P
I/45
880 IF RND(0)>.65 THEN HSET(160+
COS(RA)*40,100+SIN(RA)*40,6-RND(
2))
890 NEXT RA:H=40:FOR R=0 TO 40
900 F=R/41*2:W=INT(F):F=F-W:P=R/
40
910 FOR RA=PI/2 TO 3*PI/2 STEP P
I/127
920 XO=COS(RA)*R:YO=SIN(RA)*H
930 C=HPOINT(300+XO,100+YO)
940 IF C=0 OR RND(0)>P OR RND(0)
>(4-C)/3 THEN C=C(W+1,1-(RND(0)<
F)) ELSE C=1
950 HSET (160-XO,100+YO,C)
960 NEXT RA,R:HGET(120,60)-(198,
139),3:POKE &HE0D4,&H34
970 POKE &HFFA2,&H34:POKE 65496,
0
980 CSAVEM "LANDER1",&H4000,&H5F
FF,&HA027
990 POKE &HFFA2,&H37
1000 CSAVEM "LANDER2",&H4000,&H5
FFF,&HA027
1010 CLS:PRINT"DONE."
1020 POKE &HFFA2,&H3A:POKE 65496
,0:END
1030 X2=X1:Y2=Y1:GOSUB1040:X1=X2
:Y1=Y2:RETURN
1040 X2=X2-8:Y2=Y2-7:R=SQR(X2*X2
+Y2*Y2)
1050 IF Y2<0 THEN A=FNS(-X2/R)+P
I:GOTO 1080
1060 IF Y2>0 THEN A=FNS(X2/R):GO
TO 1080
1070 IF X2>0 THEN A=FNR(90) ELSE
 IF X2<0 THEN A=FNR(270)
1080 A=A+FNR(AO):X2=XO+SIN(A)*R:
Y2=YO+COS(A)*R:RETURN
```

170	222	1010	154	1820	30
320	54	1170	161	1970	74
510	166	1320	177	2150	161
670	1	1470	66	2300	31
850	45	1650	171	END	14

Listing 2: LANDER

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '''''''''''''''''''''''''''''
'
20 '         Lunar Lander
'
30 '        By: Jeff Donze
'
40 '        Copyright 1988
'
50 '''''''''''''''''''''''''''''
'
60 CLS:ON BRK GOTO 130:ON ERR GO
TO 100
70 POKE &HFFA2,&H34:CLOADM"LANDE
R1"
80 POKE &HFFA2,&H37:CLOADM"LANDE
R2"
90 POKE &HFFA2,&H3A:GOTO 140
100 POKE &HFFA2,&H3A:CLOSE
110 IF ERNO=26 THEN PRINT "FILE
NOT FOUND IN";ERLIN:STOP
120 PRINT "ERROR #";ERNO;" IN LI
NE";ERLIN:STOP
130 STOP
140 CLEAR:ON BRK GOTO 150
150 POKE 65497,0:POKE &HE0D4,&H3
4:LPOKE &H68000,255:LPOKE &H6800
1,255
160 FOR N=1 TO 11:HBUFF N,684:NE
XT N
170 DIM XO(10),YO(10),HT(10),VT(
10),XT(10,3),YT(10,3),TC(4,3),C(
15),M(5)
180 PD$="C12U3RD2EURXPX$;XPX$;XP
X$;XPX$;XPX$;XPX$;BLD2LGR2BR"
190 PX$="C13G3RE3BRC12G3RE3BR"
200 POKE &HEF0B,&HA8
210 RG$="006356070908360436525 46
33607070 0"
220 CM$="00631632110907040738366
35216160 0"
230 FOR N=0 TO 15:C(N)=VAL(MID$(
CM$,N*2+1,2)):PALETTE N,0:NEXT N
240 HSCREEN 2
250 FOR N=1 TO 5:READ M(N):NEXT
N
260 DATA 1,6,1,1,6
270 FOR N=0 TO 4:FOR M=0 TO 3:RE
AD TC(N,M):NEXT M,N
280 DATA 0,0,0,0,0,0,0,8,0,0,8,9
,0,8,9,10,8,9,10,11
290 FOR N=0 TO 10:READ XO(N),YO(
N),HT(N),VT(N)
300 FOR M=0 TO 3:READ XT(N,M),YT
(N,M):NEXT M,N
310 DATA 24,6,-.965,.298,- 9,-7,
 6,-7, 7, 3,-5,10
320 DATA 22,7,-.866,.500,-11,-4,
 4,-8, 8, 1,-2,10
330 DATA 18,8,-.707,.707,-11,-1,
 2,-9, 8,-1, 1,11
340 DATA 13,8,-.500,.866,-11, 2,
 0,-9, 7,-3, 3,10
350 DATA  9,8,-.298,.965,-11, 4,
-3,-9, 6,-5, 6, 9
360 DATA  8,7,+.000,1.00,- 9, 7,
-5,-8, 5,-6, 8, 7
370 DATA  6,6,+.298,.965,- 7, 9,
-7,-6, 3,-7,10, 5
380 DATA  7,6,+.500,.866,- 4,11,
-8,-4, 1,-8,10, 3
390 DATA  8,6,+.707,.707,- 1,11,
-9,-2,-1,-8,11,-1
400 DATA  8,6,+.866,.500,  2,11,
-9, 0,-3,-7,10,-3
410 DATA  8,6,+.965,.298,  4,11,
-9, 3,-5,-6, 9,-6
420 ' Title Screen
430 ON BRK GOTO 440
440 POKE &HE0D4,&H34
450 GOSUB 1620:HCLS:R=RND(-123):
GOSUB 2350
460 HCOLOR 1:GOSUB 1450:GOSUB 16
10
470 FOR X=25 TO 280 STEP 8
480 TN=INT(ABS(SIN(X/30)*4)+.5):
GOSUB 1430
490 HPUT (X,85)-(X+34,120),3,OR
500 FOR T=1 TO 40
510 IF BUTTON(0)=1 THEN 540
520 NEXT T:HPUT (X,85)-(X+34,120
),3,OR
530 NEXT X:GOTO 470
540 HCOLOR 0:GOSUB 1450
550 HPUT (X,85)-(X+34,120),3,OR
560 HCOLOR 1:HPRINT (14,2),"Luna
r Lander"
570 HPRINT (5,4),"As remote pilo
t, it is your job"
580 HPRINT (3,5),"to land the un
manned cargo ship at"
590 HPRINT (3,6),"the designated
 landing site.  For"
600 HPRINT (3,7),"each successfu
l landing you will"
610 HPRINT (3,8),"be paid accord
ing to the landing"
620 HPRINT (3,9),"site and the c
argo class.  You"
630 HPRINT (3,10),"will also be
given a bonus for"
640 HPRINT (3,11),"conserved fue
l.  Every 5th landing"
650 HPRINT (3,12),"you will be p
romoted to a higher"
```

```
660 HPRINT (3,13),"cargo class w
ith higher fuel"
670 HPRINT (3,14),"consumption.
 Slow the ship by"
680 HPRINT (3,15),"using a right
ward thrust, and"
690 HPRINT (3,16),"it will drop
from orbit.  Use"
700 HPRINT (3,17),"right joystic
k.  Pull down to"
710 HPRINT (3,18),"thrust, and a
djust angle with left"
720 HPRINT (3,19),"and right pos
itioning.  Good luck!"
730 HPRINT (9,22),"Press button
to start."
740 IF BUTTON(0)=0 THEN 740
750 ' New Game
760 LV=0:CC=1:SC=0
770 ' New Screen
780 LV=LV+1:IF LV>5 THEN LV=1:IF
 CC<5 THEN CC=CC+1
790 GOSUB 1490:HCOLOR 1:HPRINT (
2,0),"Landing Site:"+STR$(LV)
800 HPRINT (22,0),"Cargo Class:"
+STR$(CC)
810 HV=8:VV=0:G=.1:X=30:Y=30:HC=
.1:VC=.1:FL=100:FC=CC*.1:O=1:IH=
HV
820 PN=10:TN=0:GOSUB 1430:GOSUB
1390:GOTO 860
830 ' Main Loop
840 GOSUB 1390:IF PN<PR THEN PN=
PN+1 ELSE IF PN>PR THEN PN=PN-1
850 HPUT (XD,YD)-(XD+34,YD+35),L
N+1,OR
860 LN=PN:XD=INT((X-XO(PN))/2)*2
:YD=Y-YO(PN)
870 T=0:FOR N=0 TO 3:T=T OR HPOI
NT(X+XT(PN,N),Y+YT(PN,N)):NEXT N
880 HPUT (XD,YD)-(XD+34,YD+35),P
N+1,OR:GOSUB 1430
890 GF=G:IF O THEN GF=G*(IH-HV):
IF HV<4 OR Y>34 THEN O=0
900 X=X+HV:Y=Y+VV:HV=HV-HT(PN)*T
N*HC:VV=VV+GF-VT(PN)*TN*VC
910 IF O THEN IF X>290 THEN X=28
920 F=FL-TN*FC:IF F<0 THEN F=0
930 IF F<FL THEN HLINE(312,112-F
L)-(317,112-F),PRESET,BF
940 FL=F:IF T<12 THEN 840
950 ' Touch Down
960 HPUT (XD,YD)-(XD+34,YD+35),L
N+1,OR:HCOLOR M(LV)
970 IF Y<25 THEN 1150 ELSE IF T=
15 AND (X<20 OR X>290) THEN 1240
980 TA=HPOINT(X-8,Y+7) AND 14:TB
=HPOINT(X+7,Y+7) AND 14
990 IF VV<1 AND ABS(HV)<.2 AND P
N=5 AND TA=12 AND TB=12 THEN 129
0
1000 TN=0:GOSUB 1430:FOR N=1 TO
4
1010 HCIRCLE (X,Y),N*5,12-N:HCIR
CLE (X,Y),N*5-5,12-N
1020 HPAINT (X,Y-N*5+3),12-N,12-
N:NEXT N
1030 PLAY "O1L255":FOR O=1 TO 2
1040 FOR M=1 TO 4:TN=M:GOSUB 143
0:TN=M-1:GOSUB 1430:PLAY "ABC":N
EXT M
1050 FOR M=4 TO 1 STEP-1:TN=M-1:
GOSUB 1430:TN=M:GOSUB 1430:PLAY
"ABC":NEXT M,O
1060 TN=0:GOSUB 1430
1070 HPRINT (4,10),"You have cra
shed the ship!"
1080 HPRINT (4,11),"Being very d
ispleased to see"
1090 HPRINT (4,12),"their expens
ive ship destroyed,"
1100 HPRINT (4,13),"the company
has fired you."
1110 HPRINT (4,16),"Career Earni
ngs: $"+RIGHT$(STR$(SC),LEN(STR$
(SC))-1)
1120 PLAY "O2L10AGFGFEFL2C"
1130 HPRINT (4,18),"Press button
 to play again."
1140 FOR T=1 TO 6000:IF BUTTON(0
)=0 THEN NEXT:GOTO 450 ELSE 760
1150 HPUT (XD,YD)-(XD+34,YD+35),
LN+1,PSET
1160 HPRINT (6,7),"The ship has
left the gravita-"
1170 HPRINT (4,8),"tional pull o
f the moon, and you"
1180 HPRINT (4,9),"were not able
 to land it. The"
1190 HPRINT (4,10),"ship was los
t in space forever."
1200 HPRINT (6,12),"Due to the l
oss of a costly"
1210 HPRINT (4,13),"craft and it
s cargo, you were"
1220 HPRINT (4,14),"dismissed fr
om the company."
1230 GOTO 1110
1240 HPRINT (4,7),"Your ship has
 drifted out of"
1250 HPRINT (4,8),"radio range,
and you were unable"
1260 HPRINT (4,9),"to prevent it
s destruction on"
1270 HPRINT (4,10),"the lunar su
rface."
1280 GOTO 1200
1290 HPUT (XD,YD)-(XD+34,YD+13),
LN+1
1300 LP=1000+500*LV+100*CC:FB=IN
T((FL)*10):SC=SC+LP+FB
1310 HPRINT (4,6),"Great Landing
!"
1320 HPRINT (4,8),"Landing Pay:
```

```
$"+RIGHT$(STR$(LP),LEN(STR$(LP))
-1)
1330 HPRINT (4,10),"Fuel Consumt
ion:"+STR$(INT(100-FL))+"% Bonu
s: $"+RIGHT$(STR$(FB),LEN(STR$(F
B))-1)
1340 HPRINT (4,12),"Total Earnin
gs: $"+RIGHT$(STR$(SC),LEN(STR$(
SC))-1)
1350 PLAY"O3L12FGAGABO+CP16O-BP1
6O+L2C"
1360 HPRINT (4,14),"Press button
 for next landing."
1370 IF BUTTON(0)=0 THEN 1370 EL
SE 780
1380 ' Get Postion and Thrust
1390 PR=INT(JOYSTK(0)*10/63)
1400 IF JOYSTK(1)>31 AND FL>0 TH
EN TN=INT((JOYSTK(1)-32)*5/32) E
LSE TN=0
1410 RETURN
1420 ' Set Thrust Palette Colors
1430 FOR N=8 TO 11:PALETTE N,C(T
C(TN,N-8)):NEXTN:RETURN
1440 ' Title Message
1450 HPRINT (14,4),"Lunar Lander
"
1460 HPRINT (13,6),"By  Jeff Don
ze"
1470 HPRINT (14,18),"Press butto
n.":RETURN
1480 ' Draw Game Screen
1490 GOSUB 1620:HCLS
1500 PALETTE 8,63:HCOLOR 8:HPRIN
T (11,0),"One Moment Please."
1510 R=RND(-12349-LV):GOSUB 2350
1520 POKE &HE0D4,&H37
1530 ON LV GOSUB 1630,1760,1910,
2040,2190
1540 POKE &HE0D4,&H34
1550 HCOLOR 15:HLINE (0,10)-(15,
191),PSET,BF
1560 HLINE (300,10)-(319,191),PS
ET,BF
1570 HCOLOR 1:HLINE (311,11)-(31
8,113),PSET,B
1580 HCOLOR 6:HLINE (312,12)-(31
7,112),PSET,BF
1590 PALETTE 8,0
1600 HCOLOR 15:HLINE (0,0)-(319,
10),PSET,BF
1610 FOR N=0 TO 15:PALETTE N,C(N
):NEXT N:RETURN
1620 FOR N=0 TO 15:PALETTE N,0:N
EXT N:RETURN
1630 SX=52:SY=92:GOSUB 2390
1640 HDRAW "C14BM0,150R15E2RFDF2
L2U2F2DRFDFDFDR2D3R3FD2F2R2FR2"
1650 HDRAW "R4FR6FR8FR10ER4ER2EU
ER2U2RDRE2R2DR2F2D2R2F2R2E2RE2"
1660 HDRAW "RE2RE2UEUEU2EU3EU5EU
8E2RD3FR2FR3FR2FR3F2D2FDFR3F2R"
1670 HDRAW "FRFDFR2FD2R2FR3ER3ER
2ER3ER2E2RE2R2D2FRD2FDFDFR2ER2"
1680 HDRAW "E2R2E2R2FR2F2D2R2DFD
FD2FD3F2RFR2FR3FR4R30R4ER4ER3E"
1690 HDRAW "R2ER2ERERE2R2ER2ER3E
R4FR3FR2F2RF2R2R40"
1700 HPAINT (0,191),14,14
1710 HDRAW "C7BM0,174R15FR5FR4FR
5FR6FR5FR7FR6FR8FR9FR8FR7FRFR5"
1720 HDRAW "ERER2ER4ER3ERE2UEU2E
U3EU4E2RER3FRF2DFDFD3ERFDFRF2R"
1730 HDRAW "FR3F2UFRFR4ER2E2RER2
ER3ER4ER6ER5FR8FR7FR8ER30FR5F2"
1740 HDRAW "R2ER3ER5EREUER2FRFR3
FR5FR6FR5FR4ERER3ER5ER20"
1750 HPAINT (0,191),7,7:HDRAW "B
M219,178XPD$;":RETURN
1760 SX=202:SY=105:GOSUB 2410
1770 HDRAW "C14BM0,130R15E2RE2RE
R2R3FRFDF2D2FD2R2FDFRFR2FR3ER2"
1780 HDRAW "ER3ER2E2UEU2EU3EU2E2
RERER2ER3FR3F2D2R2DFD2FD3FD4F2"
1790 HDRAW "D4FD3FD2FD2FD3FD4FD3
FD2FD3FD2FDFRFR2FR3FR25ERER2ER"
1800 HDRAW "EREUEU2EU3EU2EU3EU4E
U5EU4EU3ERER2ER3ER2EU5EU6EU7EU"
1810 HDRAW "EU3EUE2ERE2ER2D2R2F2
D2F3D2F3R2FR2F2RF2RFRFR2FR2FR3"
1820 HDRAW "ER2ERE2RE2RE3REUEU2E
U3EU4EU5EU6ED3FD5DF4DF3DF4DF3D"
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1830 HDRAW "F3D2FD2FDF2RFR3FR4FR
5FR6FR5FR3FR2FR3FR4FR5FR6R20"
1840 HPAINT (0,191),14,14
1850 HDRAW "C7BM0,168R15E3RE2RE3
RE4REF2RF2DF3DF2DF3RFR2ERE2RE2"
1860 HDRAW "RER2ER3FRFR2F2DF2DFD
FRF2DRFR2FR3FR4FR45ER4ER3ER4ER"
1870 HDRAW "ER3ERE2RE3RE4RE2RE3R
E4RE3RE2RER2RE2R4F2R2ERE3RE4RE"
1880 HDRAW "RE3RE2R2ER2DFD4FD3FD
2F2R3FR2RFRF2RFR2FR4FR5FR3FR4F"
1890 HDRAW "R4FR5FR8FR6FR5FR7R20
"
1900 HPAINT (0,191),7,7:HDRAW "B
M105,184XPD$;":RETURN
1910 SX=100:SY=105:GOSUB 2430
1920 HDRAW "C14BM0,140R15ER5ER4E
R3ER4ER2ER4ER3ER2ERE2ERER2ERE2"
1930 HDRAW "RE2RER2ERER2ER3ER4FR
F2RF3RF2RFDF2DFDFD3FD2F2RFR2FR"
1940 HDRAW "ERERE2RE3RE2RE3REUEU
E2UE3UE2UEU2EU3EU2R2FRF2RF3RF2"
1950 HDRAW "RF2RF3RFDFD2FD6FD7FD
8FD8R30EU2EU6EU6F2DFDF2DF3DFD2"
1960 HDRAW "FDF2DF3DF4DF2DFRFR2F
R3FR4FR2FR3ER3ER2ERER2ERER2E2R"
1970 HDRAW "E3RE3RE2RER2ER3FR2FR
F2RF3RF4RFR2FR30"
1980 HPAINT (0,191),14,14
1990 HDRAW "C7BM0,164R15E3RE3RE3
RE2RE3RE4RF2DF3DF2DFRFR2ERE2R2"
2000 HDRAW "ERE2RE3F2E2RE2F3DF2D
F4DF2DF5DF4D2FDFRFR2FR3FR4FR5F"
2010 HDRAW "R6ER4ER3ER5ER2ER4ER3
ER2ER3ER5ER6FR5FR4FR2FR4FR5FR6"
2020 HDRAW "FR7FR5FR6FR4FR6ER5ER
4ER7ER4ER6ER4ER8ERER6F2R40"
2030 HPAINT (0,191),7,7:HDRAW "B
M170,161XPD$;":RETURN
2040 SX=250:SY=105:GOSUB 2390
2050 HDRAW "C14BM0,165R15ER4F2R3
FR2ER2ER4ER3ER2ER2ERERE2RE3RE2"
2060 HDRAW "RE3RE2RE3RERE2RER2ER
3ERE2RERE2RE2FRF2FRF2RF3RF2RFR"
2070 HDRAW "F2RFDFD3FD4FD3FD6FD4
FD7FR30EU5EU4EU6EUEU2EUEU3EU2E"
2080 HDRAW "U2EUEU2E2UEU2EU2E2F3
DFDF2DF3E2R2EREUEU2EUE2UE3UE2U"
2090 HDRAW "E3UE2UE3UE2UER2ERE3U
E4RE3UE2F2DF2DF3DFD2FD3FD2FD3F"
2100 HDRAW "DFD3FD2FRF2E3UE3UE2U
E3UE2FD2F2DF3DFDF2DFDF3DF2RF3R"
2110 HDRAW "F3RFR2ERE2RE4RE3RE2R
E5R20"
2120 HPAINT (0,191),14,14
2130 HDRAW "C7BM0,173R25ER5ER4ER
5ER3ER2ER4ER5FR2FR3FR3FR2FR2F2"
2140 HDRAW "RFRFR2FRFR8FRFRFR6FR
3FR2R45ER4ER3ER2ERER3ER2ERERE2"
2150 HDRAW "RE2RERE2RERE2UE2UE3U
E2UEU2EU3EDFD2FDF2DF3DF4DF3DF2"
2160 HDRAW "DF3E2RE3RE2RE4RE3RE2
RERE2RERE2UE2F2DF2DF3DF2DF4DF3"
2170 HDRAW "DF3DF2E4RE3RE2RE4RE3
RE5RER20"
2180 HPAINT (0,191),7,7:HDRAW"BM
126,185XPD$;":RETURN
2190 SX=85:SY=105:GOSUB 2410
2200 HDRAW "C14BM0,140R15E2RE2RE
2RE2F2R2F2RF2RF2RFRFR2FRFR2FR2"
2210 HDRAW "FR3FR4ER3ER2ERER2ERE
2RE2UE2UE2UE2UE2F3DF3DF2DF2DF2"
2220 HDRAW "E2RE2RE3RE2F2RF2RF2E
2RE2RE3UE2UE2F2RF2RFRF2RFR2FR2"
2230 HDRAW "ER2ERE2UE2UE2F2DF2DF
2D2FD2FD2FD4F2DFD3G2D3FD6GD3F2"
2240 HDRAW "DG2D4R30U2EU6HU2EU2H
2UE2U4EU5EU3EU2E2UE2UE2U2EU2EU"
2250 HDRAW "E2F2R2FDF2DF2DF3DFRF
R2ERE2RE2RE3RE2RE3RE2F2DF2DF3D"
2260 HDRAW "F2E2UE2UE3F2RF2DF2E3
RE3RE3RE3RE3RE3R20"
2270 HPAINT (0,191),14,14
2280 HDRAW "C7BM0,165R15F2RF2RF2
F2RE2RE2RE2RE2RE2RE2E2R4F3R2FR"
2290 HDRAW "ER2ER3ER2ERERE2RE3RE
2F2R3F2RF2RF2RF2DF3DF2R4F2E2RE"
2300 HDRAW "RE2RE3RE2RE2F2RF2DF2
DF3DF2DFR2ER2ERE2RE3RE2F2RF2RF"
2310 HDRAW "RF2RF2RF2RF2RR30E2RE
2RE2R3ER4ER3FR3FR2ER3ERER2ERE2"
2320 HDRAW "RE2RE3RE2RE3RE2RE3RE
2F2RF2DF2DF3DF2E3RE2UE3UE2UE2R"
2330 HDRAW "E3F4R20":HPAINT (0,1
91),7,7:HDRAW "BM173,181XPD$;"
2340 RETURN
2350 FOR N=1 TO 150:HSET (RND(28
5)+10,RND(181)+10,RND(5)):NEXT N
2360 FOR N=1 TO 3:X=RND(285)+15:
Y=RND(171)+10
2370 HDRAW "BM=X;,=Y;C5NR4NL4ND4
NU4C4NDNUNLNR":HSET (X,Y,1):NEXT
 N
2380 RETURN
2390 HCIRCLE (SX,SY),17,15:HPAIN
T (SX,SY),1,15:HPAINT (SX,SY),0,
15
2400 HCIRCLE (SX,SY),17,0:HPUT (
SX-44,SY-17)-(SX+44,SY+16),1,OR:
RETURN
2410 HCIRCLE (SX,SY),40,15:HPAIN
T (SX,SY),1,15:HPAINT (SX,SY),0,
15
2420 HCIRCLE (SX,SY),40,0:HPUT (
SX-40,SY-40)-(SX+38,SY+39),3,OR:
RETURN
2430 HCIRCLE (SX,SY),29,15:HPAIN
T (SX,SY),1,15:HPAINT (SX,SY),0,
15
2440 HCIRCLE (SX,SY),29,0:HPUT (
SX-30,SY-30)-(SX+28,SY+29),2,OR:
RETURN
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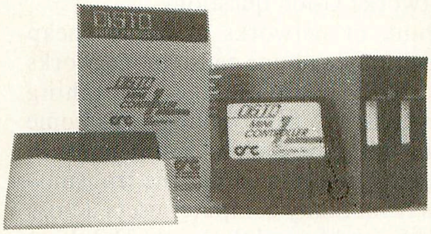

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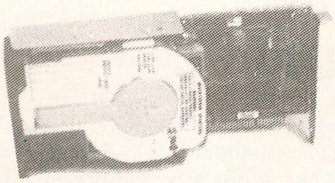

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Delphi Bureau

Get the facts about FAX

At Your Service

By Don Hutchison
Database Manager Emeritus

Several users have recently asked what networks are. We use Telenet and Tymnet to get onto Delphi, but what *is* a network? Good question!

Think of networks as really cheap long-distance phone calls. Yet networks are highly sophisticated, stretching from coast to coast, linking your home phone with the Delphi mainframes in Boston. Networks gather the transmissions from many computer users across the U.S. and funnel them into Delphi at 10 million bits per second through fiber-optic transmission facilities and even satellites in some cases. Delphi sorts out these transmissions, then prepares responses for all of the users. It then sends the responses into the network and back to the users.

Networks such as Telenet and Tymnet will never be as fast as communications between two computers. These must divide their time between thousands of users, while PC-to-PC connections involve only two computers. Delphi is also a multiuser system and, like any system, will slow down if dealing with thousands of users.

Why, then, does Delphi use networks like Telenet and Tymnet? Simple. It's less expensive for the users. Networks are an economical alternative to long-distance calls. You have the option of calling Delphi direct through your local phone company, but most users don't do that. While Delphi reduces your connect charges by about $1.20 per hour, if you call direct, you'll have to pay long-distance charges of about $15 per hour. It's a trade-off: The user gets a somewhat reduced speed of performance, but also a lower phone bill.

To avoid slowdowns when many users are online, try calling Delphi during the nonpeak hours. Generally, Delphi is busiest from around 9:00 p.m. through midnight, Eastern time. If you access the system at another time, you'll find things run somewhat faster. Avoid signing on when the *Trivia Quiz* game is running unless you intend to play. *TQ* is very popular and has dozens of players online during its hours.

Don't confuse Delphi and Telenet/Tymnet. Delphi is a service based near Boston. Telenet and Tymnet are telecommunications networks that operate throughout the United States. They are two completely separate operations.

FAX Service Available on Delphi

At times, it is advantageous for me to send a letter to noncomputer people from my computer. The advantage is speed — you can send overnight or "next day" mail from your computer.

I looked around and was amazed to find that Delphi has a FAX interface in its mail system. Just blast a text file into the system, and it will be FAXed to the FAX phone number you specify.

For those who aren't familiar with FAX, it stands for *facsimile transmission*. It sends a copy (facsimile) of a sheet of paper to another machine through the phone system. It's a copy machine connected to your phone. To use it, just feed the original into your FAX machine, call the remote FAX machine, and a copy of your document is teleported to the other machine.

How do you use the FAX interface on Delphi? It's easy, really. First, remember you must be at the main DMAIL menu. (DMAIL stands for Delphi Mail.) If you're at the CoCo SIG prompt, you can get to DMAIL by typing, `go dmail`. If you want to enter the FAX system directly, you can type `go dmail fax` and you'll be there.

Sending text messages to Group III facsimile machines requires you to know the area code and phone number of the FAX machine you are calling for messages destined to the United States,

Database Report

OS-9 Online

In the General topic of the database, **Stephen Macri** (DRACMAN) sent us the Level II bootlists for use with *MultiVue*, the *Wiz* and *Deskmate 3* to run these programs from a RAM disk or DS disks. The Applications topic brings us **Jeff Blower** (SEBJMB), who uploaded a *Murphy's Law* program. **Robert Parker** (SYSTEMX) sent us a fortune cookie program.

In the Utilities topic, **Steve Clark** (STEVECLARK) posted a utility to determine execution times of programs. **John Beveridge** (JOHNTORONTO) sent us version 1.6 of *YAZ, Yet Another Zapper* and *Man*, a program which replaces OS-9's `Help` command. **Jim Woodward** (JIMWOOD) uploaded a file comparison program. **Roger Krupski** (HARDWAREHACK) uploaded *CMPFix*, a filter for generating a `ModPatch` compatible file from the output of CMP. **Rich Ries** (RRIES) sent us the C source code for an `INKEY$`-like program.

The Patches topic includes **Greg Law** (GREGL), who uploaded a patch to the popular *RS-OS9* program. Roger Krupski sent us a small patch for fixing the `Boot` module in OS-9 Level II to shut off the floppy drive motors after loading a file. **Denny Skala** (DENNYSKALA) uploaded a patch for the Level II clock module to allow it to access the Burke & Burke real-time clock directly.

The Telcom topic brings us **Newton White** (PERFUMER), who uploaded version 1.4.2 of *OSTerm* by Vaughn Cato. **Bill Brady** (OS9UGED) posted a small patch file that corrects some Xmodem downloading bugs in *The Wiz*. In Graphics & Music **Bob Montowski** (GRAPHICSPUB) sent us some Gemini printer fonts. **Jim Buck** (COCOROGUE) posted an `Ultimuse` file from the song *25 or Six to Four*.

CoCo SIG

In the General topic of the database, **Brian White** (BRIANWHITE) posted additional documentation files for *MAX-10*, which were obtained directly from the program's author, Dave Stampe. **Kevin Leger** (KEVINLEGER) posted a file describing how to use a monochrome monitor on a CoCo 3.

Don Hutchison works in Birmingham, Alabama, as a senior project engineer involved in the design of industrial control systems. His Delphi username is DONHUTCHISON.

Canada and the Caribbean. For international FAX, you need to know the country code, city code and phone number of the destination terminal.

A FAX message can be created in your workspace and sent at the filename prompt, or it can be typed live. The same message can be sent to multiple FAX machines by simply entering each destination number when prompted. FAX messages may be up to 50,000 characters in length. That's a lot of information.

If you want to include page breaks in your copy, enter `/PAGE` as a separate line of text at each appropriate place in the message.

The rates for sending FAX messages are as follows:

Destination	First Page	Additional Half Pages
United States	$1.25	$0.50
Canada	$2.00	$1.00
International	$7.00	$2.00

A page is defined as 2500 characters, a half-page as 1250. Each FAX sent to multiple numbers will be billed at the above rates. You can send them throughout the day, generally within minutes. You will receive notification if your FAX is not sent.

There are all kinds of uses for this service — Valentine's Day messages, or if you forget someone's birthday and want to send a "quick card" via FAX. Business uses are almost endless, the best benefit being the speed of information flow.

Changing of the Guard

For those who have not read Forum Message 48439, I have elected to retire from my duties as the Database Manager on the RAINBOW CoCo SIG. With a new job, I don't feel I can do justice to normal database duties any longer.

Replacing me will be Tim Koonce, whose username on Delphi is TIMKOONCE. Tim is a graduate student at Berkeley studying mathematics. Since he is a frisbee freak, he should have all the qualifications to handle the "quirkiness" of our databases and to field user questions.

Assisting Tim will be Eddie Kuns (EDDIEKUNS) and Dave Archer (DAVEARCHER), so please address your questions to them concerning the database. Jim Reed (JIMREED), Marty Goodman (MARTYGOODMAN), Greg Law (GREGL) and Rick Adams (RICKADAMS) will also be online to help out as needed.

Please join me in welcoming Tim to the staff of the CoCo SIG. I'm sure he'll do a fine job! ☐

The CoCo 3 Graphics topic brings **Richard Trasborg** (TRAS), who posted some dithered DS69B pictures from Mike Trammell. Mike's pictures are always popular. **Jason Forbes** (COCO3KID) posted some fractal images. **Dan Shargel** (TRIUMPH) uploaded his original drawing of the *Rush* logo and a loader program for *View Master*. **Howard Rouse** (HOWARDC) posted his favorite original *CM3* pictures. John Beveridge posted a picture file which describes the internal structure of the *MAX-10* "clicker."

In the Utilities & Applications topic **Philip Woodring** (PHILWOOD) uploaded an `HSCREEN4` printer dump program for the CGP-220. **Roger Carlson** (PERCH) posted a program to generate the statistical process control charts used in many industries. **Eric Parish** (ERICPAR) sent us an improved version of his popular planetarium program. **Jim Pogue** (JIMPOGUE) uploaded the parallel port drivers for use with the hardware project in the November and December '87 issues of THE RAINBOW. John Beveridge posted a program to calculate intermodulation products. **Edwin Albert** (EEA) sent us a quickie program for booting TW-128. **Ken Wuelzer** (WUELZERKEN) uploaded version 2.7 of his very popular *KDSK* program. **Jerome Kalkhof** (GRUMCLUB) sent us a program that prints any ASCII file to the printer or the screen.

Hardware Hacking brings **Marty Goodman** (MARTYGOODMAN), who posted text files describing how to fix an Epson MX-80 printer and how to construct a "cable connector masher." (Mashers everywhere will be interested.)

In the Games topic of the database, **Alan DeKok** (ALANDEKOK) posted a set of patch files for the *Thexder* game. **Fred McDonald** (FREDMCD uploaded a nice line game. **Robert Combs** (ROBCOMBS) sent us a missile game.

In the Music & Sound topic **Ken Furlow** (SAPPHIRE2) favored us with eight more of his favorite *Musica* songs. **George Hoffman** (HOFFBERGER) sent us another of his favorite Lyra songs.

The Telecommunications topic brings **Greg Miller** (GREGMILLER), who uploaded Version 2.5 of his popular terminal program *GETerm*. The latest version features direct-to-disk downloading and Ymodem support, among other goodies. **Mike Andrews** (MANDREWS) posted an alternate IBM-style character set for the popular CoCo 3 terminal program, *V-Term*. Edwin Albert uploaded a text file describing the use of an Avatex 1200E modem with the CoCo 3.

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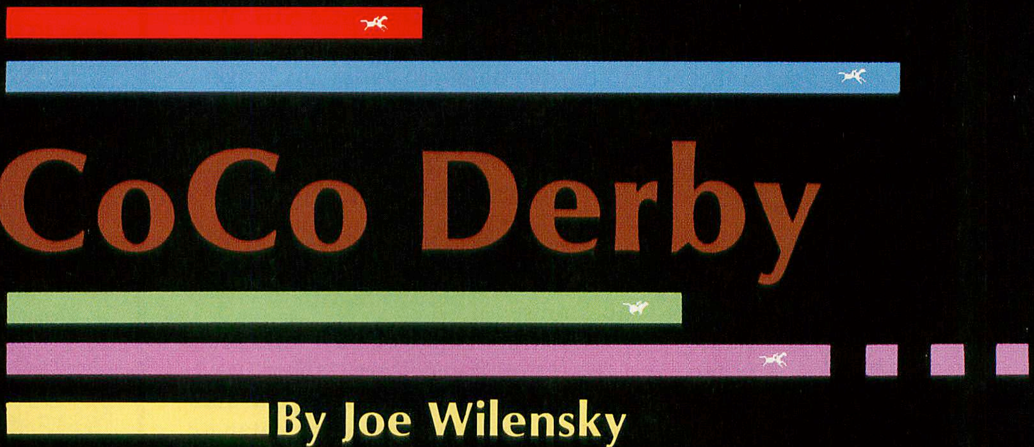
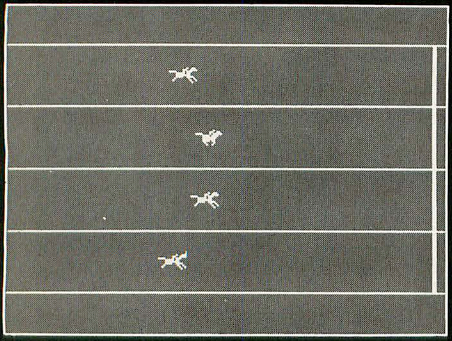


CoCo Derby

By Joe Wilensky

For those of you who can't always go to the races as often as you'd like, here's an entertaining alternative: a day at the races at the TRS-80 Raceway! Place your bets — the CoCo Derby is about to begin!



This game runs with a 16K Color Computer with Extended Color BASIC. The game starts with the title screen, a few musical tones and the message "Setting up". You are then asked if you want to use the speed-up poke during the running of the race. Each race is about a minute and twenty seconds without the speed-up poke, about a minute with it.

Joe Wilensky is a political science major at the State University of New York at Binghamton. His other interests include theater and cartooning.

After deciding whether or not to use it, choose the number of races to run in the game (as many as you want), and the number (1 to 4) and name of each player. If you have less than four players, the computer will play the others.

After selecting the players, a scoreboard appears with columns for the name, wallet, horse bet on and amounts bet for each player. The players now choose from four horses. You can bet on any one you want, even if someone else has picked it. The players taken by the computer bet and pick horses automatically. Then each player places the amount of his or her bet. You can't bet more than you have in your wallet, and any player who loses all of their money has to drop out of the game, which means no more betting or picking horses. With bets made, you are told to press ENTER to start the race.

The PMODE 4 screen appears and the racetrack is drawn, with four separated lanes. The top lane is for Horse 1, the second for Horse 2, and so on. A shortened version of the call to the post is played, twice for the first race, once for all other races. The horses appear one at a time, drawn with detail and a rider. After a short delay, a low tone sounds — and they're off!

The running horses actually move their feet and bob their heads. This is achieved with GET-PUT, using two separate figures of a running horse. During the race the pictures alternate quickly, giving speed and animation to the horses.

There is a clearly marked finish line and as each horse hits it, a musical tone plays and the number of the horse is ranked as it finishes. After the fourth-place horse crosses, there is more music. Push any key to return to the scoreboard. Each player's wallet is adjusted accordingly; those who don't win lose the amount they bet from their wallets, and those who win gain their wager.

Betting for the next race begins, and that is how the game goes. At the end of the last race, the scoreboard appears and the computer states who has won and the player's number, and more music is played.

(Questions or comments concerning this program may be directed to the author at 1 Oak Ridge Place, 4C, Eastchester, NY 10709. Please include an SASE when requesting a reply.) ☐

1220	71	2140	183
1400	252	2350	204
1610	29	END	60
1880	49		

The Listing: DERBY

```
 0 ' COPYRIGHT 1989  FALSOFT,INC
 1000 'The CoCo Derby!
 1010 '
 1020 'By Joe Wilensky
 1030 '1 Oak Ridge Place
 1040 'Eastchester, N.Y. 10709
 1050 'title screen
 1060 CLS3
 1070 PLAY"V25"
 1080 PRINT@224,"WELCOME TO THE T
RS-80 RACEWAY!!!";
 1090 SCREEN0,1
1100 PLAY"T5CEGP15CEGP15CEG"
1110 'put horses in arrays
1120 CLS0
1130 PRINT"SETTING UP...";
1140 FORX=1TORND(RND(RND(985))):
T=RND(TIMER):NEXTX
1150 'H=HORSE ARRAY, R=# OF RACE
S
1160 'P=# OF PLAYERS, P$(X)=NAME
 OF   PLAYER(X)
1170 RN=1
1180 DIMH(3,2),I(3,2)
1190 PMODE4,1:PCLS
1200 DRAW"BM129,98"
1210 DRAW"R3BR1BD1D2NG2R1U2D2R1U
2D1R1D1U1ND1R4L1D1NF3R3NF2L3U2R1
E1U1R3L1U1L1D1L1D1L2BL2U1R1E1G1L
1D2L5"
1220 PRESET(132,99)
1230 GET(127,96)-(145,104),H,G
```

```
1240 DRAW"BM160,98;R3BR1BD1D2D1R
1D1F1H1U1R2E1F1R1NU1D1G1E1U2E3R1
L1U1L1D1L2H1NE1L1D1BL3D1R2BR2BNU
1R2NG2G1L5D1R2"
1250 PRESET(165,98):PRESET(166,9
8)
1260 GET(158,96)-(176,104),I,G
1270 PCLS
1280 'questions to player(s)
1290 CLS 0
1300 PRINT"USE HIGH-SPEED POKE";
:INPUTQ$:CLS0
1310 INPUT"HOW MANY RACES";R
1320 IF R<1 THEN 1310
1330 INPUT"HOW MANY PLAYERS (1-4
)";P
1340 IF P<1 OR P>4 THEN1330
1350 PRINT
1360 FOR X=1 TO P:PRINT"NAME OF
PLAYER"X;:INPUTP$(X):NEXTX
1370 IFP<4THEN FOR X=(P+1) TO 4:
P$(X)="TRS-80":NEXTX
1380 W(1)=1000:W(2)=1000:W(3)=10
00:W(4)=1000
1390 'main scoreboard and bettin
g
1400 CLS
1410 PRINT"NAME   WALLET  HORSE
 BET"
1420 PRINT"--------------------
----"
1430 PRINT@64,P$(1);:PRINT@71,W(
1);
1440 PRINT@96,P$(2);:PRINT@103,W
(2);
1450 PRINT@128,P$(3);:PRINT@135,
W(3);
1460 PRINT@160,P$(4);:PRINT@167,
W(4);
1470 PRINT@192,"----------------
---------"
1480 IF RN>R THEN 2400
1490 PRINT
1500 PRINT@416,"BETTING FOR RACE
 NO."RN;
1510 FOR X=1 TO P
1520 IFW(X)=0THEN1570
1530 PRINT@256,P$(X)", WHAT HORS
E (1-4)";:INPUTHR(X)
1540 PLAY"T255O5AEC"
1550 IF HR(X)<1 OR HR(X)>4 THEN
1530
1560 PRINT@((X*32)+15)+32,HR(X);
1570 NEXTX
1580 FORT=1TO460:NEXTT
1590 IFP=>4THEN1660
1600 FORT=1TO460:NEXTT
1610 FORX=P+1TO4
1620 HR(X)=RND(4)
1630 PRINT@((X*32)+15)+32,HR(X);
1640 PLAY"T4CE"
```

```
1650 NEXTX
1660 FORX=1TOP
1670 IF W(X)=0THEN1730
1680 PRINT@256,P$(X)", WHAT'S YO
UR BET";:INPUTB(X)
1690 PLAY"T255O1ACEFF+"
1700 IF B(X)>W(X)THEN1680
1710 IF B(X)<.5 THEN1680
1720 PRINT@((X*32)+21)+32,B(X);
1730 NEXTX
1740 FORT=1TO460:NEXTT
1750 IFP=>4THEN1820
1760 FORX=P+1TO4
1770 IF W(X)=0 THEN 1810
1780 B(X)=RND(151)+49
1790 PRINT@((X*32)+21)+32,B(X);
1800 PLAY"T4EC"
1810 NEXTX
1820 PRINT@416,"PRESS <ENTER> TO
 START RACE      NUMBER"RN".";
1830 IF INKEY$<>CHR$(13)THEN1830
1840 CLS0
1850 'the race the race the race
1860 PL=0
1870 PMODE4,1:PCLS:SCREEN1,1
1880 LINE(0,24)-(255,24),PSET
1890 LINE(0,60)-(255,60),PSET
1900 LINE(0,96)-(255,96),PSET
1910 LINE(0,132)-(255,132),PSET
1920 LINE(0,168)-(255,168),PSET
1930 LINE(248,24)-(248,168),PSET
1940 LINE(249,24)-(249,168),PSET
1950 FORX=1TO4:X(X)=2:NEXTX
1960 Y(1)=38:Y(2)=74:Y(3)=110:Y(
4)=146
1970 IF RN=1 THEN V=2 ELSE V=1
1980 GOSUB2530
1990 FORX=1TO4
2000 PUT(X(X),Y(X))-(X(X)+18,Y(X
)+8),H,PSET
2010 PLAY"T4O1B"
2020 NEXTX
2030 FOR T=1 TO 920:NEXT T
2040 'start running
2050 IF Q$="Y" OR Q$="YES" THEN
POKE65495,0
2060 PLAY"T255O1CFAO2CFAO3CFAO4C
FAO5CFA"
2070 X=RND(4)
2080 IF X(X)=0THEN2070
2090 X(X)=X(X)+1
2100 IF(X(X))/2=INT(X(X)/2)THEN2
130
2110 PUT(X(X),Y(X))-(X(X)+18,Y(X
)+8),I,PSET
2120 GOTO2140
2130 PUT(X(X),Y(X))-(X(X)+18,Y(X
)+8),H,PSET
2140 IF(X(X)+18)>=248THENGOSUB21
60
2150 GOTO2070
```

```
2160 PLAY"T2O2CGF":'winnings
2170 X(X)=0
2180 FORT=1TO500:NEXTT
2190 PL=PL+1
2200 IFPL>1THEN2260
2210 '
2220 WN=X
2230 F=X
2240 GOSUB2340
2250 GOTO2270
2260 F=X
2270 S$=STR$(Y(F)):T$="BM200,"+S
$
2280 IFPL=1THENDRAW"XT$;D8"
2290 IFPL=2THENDRAW"XT$;R5D4L5D4
R5"
2300 IFPL=3THENDRAW"XT$;R5D4NL5D
4L5"
2310 IFPL=4THENDRAW"XT$;D4R5U4D8
"
2320 IF PL=4THENRN=RN+1:GOSUB249
0:POKE65494,0:GOTO1400
2330 SCREEN1,1:RETURN
2340 'wallet reducing
2350 FOR X=1TO4
2360 IFHR(X)=WN THEN W(X)=W(X)+B
(X):ELSEW(X)=W(X)-B(X)
2370 IFW(X)<=0THENB(X)=0:HR(X)=0
2380 NEXTX
2390 RETURN
2400 'end of game
2410 IFW(1)>W(2)ANDW(1)>W(3)ANDW
(1)>W(4)THENWN=1
2420 IFW(2)>W(1)ANDW(2)>W(3)ANDW
(2)>W(4)THENWN=2
2430 IFW(3)>W(1)ANDW(3)>W(2)ANDW
(3)>W(4)THENWN=3
2440 IFW(4)>W(1)ANDW(4)>W(2)ANDW
(4)>W(3)THENWN=4
2450 IF WN=0THENPRINT@256,"THERE
 IS NO WINNER!"ELSEPRINT@256,"TH
E WINNER IS "P$(WN)",":PRINT@288
,"PLAYER NUMBER"WN"!"
2460 PRINT@352,"THANK YOU FOR PL
AYING NEW        D E R B Y  2 !"
2470 PLAY"T2O3CCF"
2480 END
2490 FORT=1TO600:NEXTT:PLAY"O3T4
FP4T8CCP6T6DCP4T4EF"
2500 IFINKEY$=""THEN2500
2510 RETURN
2520 'call to the post
2530 PLAY"T4P1":FORT=1TOV:PLAY"V
31T4O3L8CFAO4CL8CCCCL8CO3AL8AAAA
L8AFAFL1CL8CFAO4CL8CCCCL8CO3CL8C
CCCL8CL1FP8":NEXTT
2540 PLAY"L4V25"
2550 RETURN
```

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See Review 'Rainbow' 2/89

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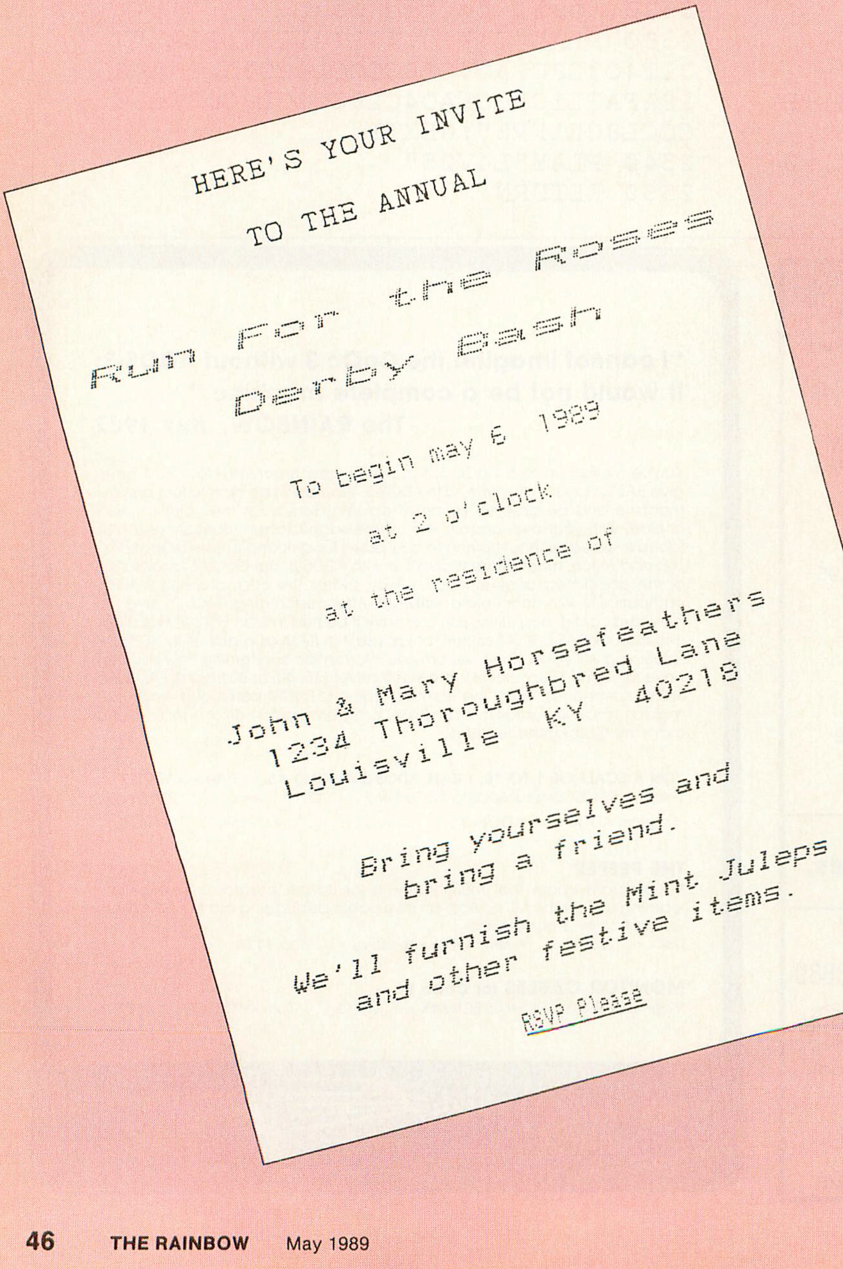
Having a Party?

By R.J. McCorkle



HERE'S YOUR INVITE

TO THE ANNUAL

Run for the Roses

Derby Bash

To begin may 6 1989

at 2 o'clock

at the residence of

John & Mary Horsefeathers
1234 Thoroughbred Lane
Louisville KY 40218

Bring yourselves and
bring a friend.

We'll furnish the Mint Juleps
and other festive items.

RSVP Please

Invite is a program that lets you create a series of 33 lines of text, choose the print style for each line, print four copies per page (with or without names), and save the "invitation" to tape or disk.

Either type in and `CSAVE` the program (`SAVE` for disk) or `CLOAD` it from tape (`LOAD` for disk), then type `RUN` and press ENTER. The screen asks what type of printer you are using; answer by pressing the letter A, B or C of your choice. If you don't have a DMP-105, DMP-130 or Epson RX-80, there are tips later in the article for modifying the program to match your printer.

The main menu should now be on the screen. To create the invitation, press C. When it is printed, the invitation starts at the top line of the page and ends at the last line of the page, so you may want to leave the first and last few lines blank by pressing ENTER when asked for a line.

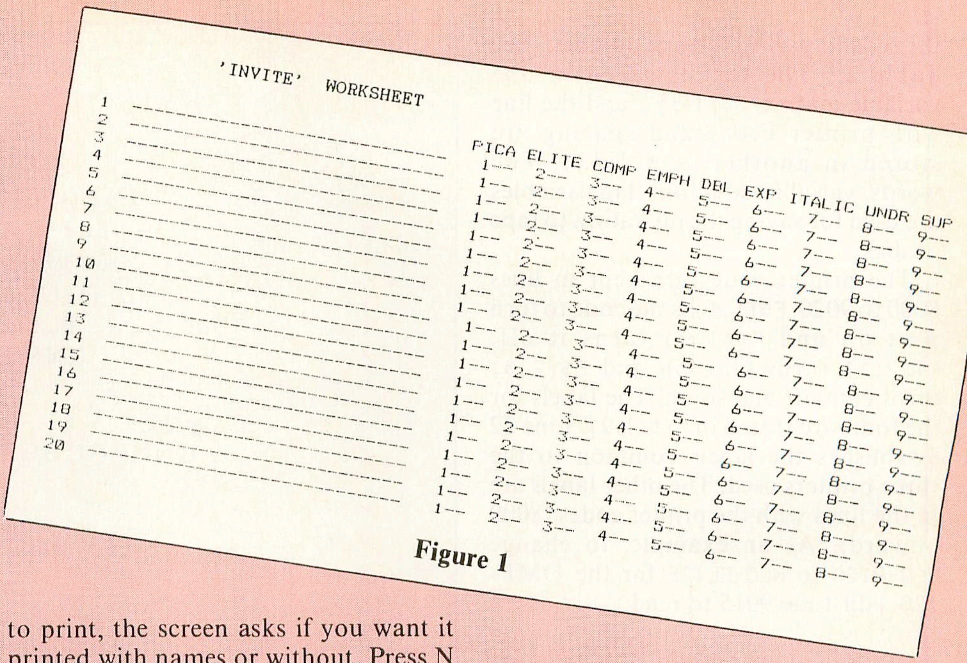
There are 33 lines available. Type in the words you want on the line, then press ENTER. The font (size and style) menu appears with the line at the top of the page. Press the number of the font you want and a graphics block appears

---

R.J. McCorkle went into "semi-retirement" three years ago to concentrate on programming. He is also a "high-tech" fix-it man, who tries to replace blown fuses in cash registers, video games, cable TV equipment, etc.

by the number. To turn off a font when the graphics block is on, press the number again and the graphics block is erased. You can use as many of the fonts as you want, but only one of pica, elite or compressed will appear. If none of these three is chosen, pica is selected.

Press N or E when you are finished with that line (the E choice is used during editing so that you don't have to go through all 33 lines). If you want to re-enter the line, press R. When you get 33 lines in memory, the program goes back to the main menu. The invitation can now be saved to tape or disk, edited, viewed on the screen or printed. Press the letter of your choice. If you choose to print, the screen asks if you want it printed with names or without. Press N for names or W for without. If you want it without names, you are prompted to enter the number of pages you want.



```
        'INVITE'  WORKSHEET
 1 ------------------------------
 2 ------------------------------
 3 ------------------------------
 4 ------------------------------      PICA ELITE COMP EMPH DBL EXP ITALIC UNDR SUP
 5 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
 6 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
 7 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
 8 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
 9 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
10 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
11 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
12 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
13 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
14 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
15 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
16 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
17 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
18 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
19 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
20 ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
   ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
   ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
   ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
   ------------------------------       1---  2---  3---  4--- 5--- 6---  7---  8--- 9---
```

Figure 1

Four copies are printed per page. Get the paper perforation just above where the first line will be printed. The program uses all 66 lines usually available per page. Each line of print should come out centered in its section of the page.

If you choose to have names printed in the invitation, you are prompted to enter the line number (1 to 33) where you want the names printed. The names will replace anything already on that line, so be careful of your choice. Enter each name, then enter `XX` and the printing begins, putting a different name in each invitation.

The major working part of the program is in lines 100 to 187. (See Table 1.) This portion is used during creating, editing and loading to determine what fonts are to be used and to add the printer codes and spacing to the words on each line. The font menu works by peeking the video-screen memory location to the right of the number pressed and poking a graphics block (169) if the space is blank, or poking a blank video code (96) if it is not blank. When E or N is pressed, or if loading, the memory location by each number is peeked. If it has (169) (the graphics block) in it the printer codes and spacing for that choice are added to the words. Then the choice's flag, `F(1-9,1-33)`, is set to 1.

The first part of the variable corresponds to the font number choice and

Lines	Descriptions
9-90	Initialize variables; define printer; main menu
100-187	Create invitation
200-250	Retrieve from tape or disk
300-335	Edit invitation
400-480	Print invitation
500-550	Save to tape or disk
600-615	View invitation on screen
620-635	View ASCII codes of a line; used as a desk check if problems occur; used in immediate command mode
700-710	Quit program
800-815	Subroutine used for marking font menu while retrieving from tape or disk
900-997	Various subroutines for inputs
8000-9020	Printer codes

Table 1: Program Description

Table 2: Variable Descriptions

`A`	Number of pages of invitations without names to be printed
`B`	96; Character code for blank space
`C`	Line counter for number of lines in invitation
`D`	`FOR/NEXT` counter when printing 33 lines of invitation
`E$`	`CHR$(27)`; Printer escape code
`F`	`FOR/NEXT` counting variable
`F$`	(1-9, 0 or 1) Printer control codes for font choice 1-9; `F$`(1-9,0) turns off; `F$`(1-9;1) turns on the choice `F`(1-9;1-33) 1 or 0; indicates whether line 1-33 uses font choice 1-9; 1 indicates yes `FT$`(1-9) labels for type font choices 1-9
`H`	Number of names to be printed
`J`	`FOR/NEXT` counter
`K`	`VAL(K$)`; Number value of key pressed
`K$`	`INKEY$` result; what key was just pressed
`L`	Length of invitation line without printer codes
`LC`	Line length checker
`LN`	Number of the line chosen to hold the names
`N$`	(1-33) 33 Lines of invitation without printer codes
`NI$`	Filename of invitation used when saving or retrieving
`NJ$`	(1-33) 33 lines of invitation with printer codes
`NN$`	() Individual names
`P&`	`H421`; Video screen memory address one line above choice menu
`P$`	First part of printer code for each line as it is put into memory
`P1$`	Second part of printer codes; contains the spaces to the right margin
`P2$`	Third part of printer codes; turns off the special fonts Q video memory location of menu choice when creating or editing invitation
`T32`	;Number of spaces between the start of a line on the screen and the start of the next line
`T$`	Tabbing variable; adds spaces
`T1$`	Tabbing variable; adds spaces
`W`	Flag showing 1 for editing and 2 for retrieving in `'CREATE INVITATION'` section
`Z`	`169`; Graphics character indicating choice

the second part to the line number. (See Table 2.) The text is saved in one variable matrix, `N$(1-33)`, and the line with printer codes and spacing are stored in another, `NJ$(1-33)`. The words, variables and font flag variables are used for saving the invitation to tape or disk.

The printer codes are kept in lines 8000 to 9020. `F$(1,1)` is the code to turn pica on and `F$(1,0)` turns it off. `F$(2,1)` turns elite on and `F$(2,0)` turns elite off and so on. The labels for the fonts are stored in `FT$(1-9)`. Line 22 establishes the labels common to the three printers used. The other labels are in the lines with the printer codes (8000 onward). As an example, to change `NLQ-PICA` to `NLQ-ELITE` for the DMP-130, edit Line 9015 to read:

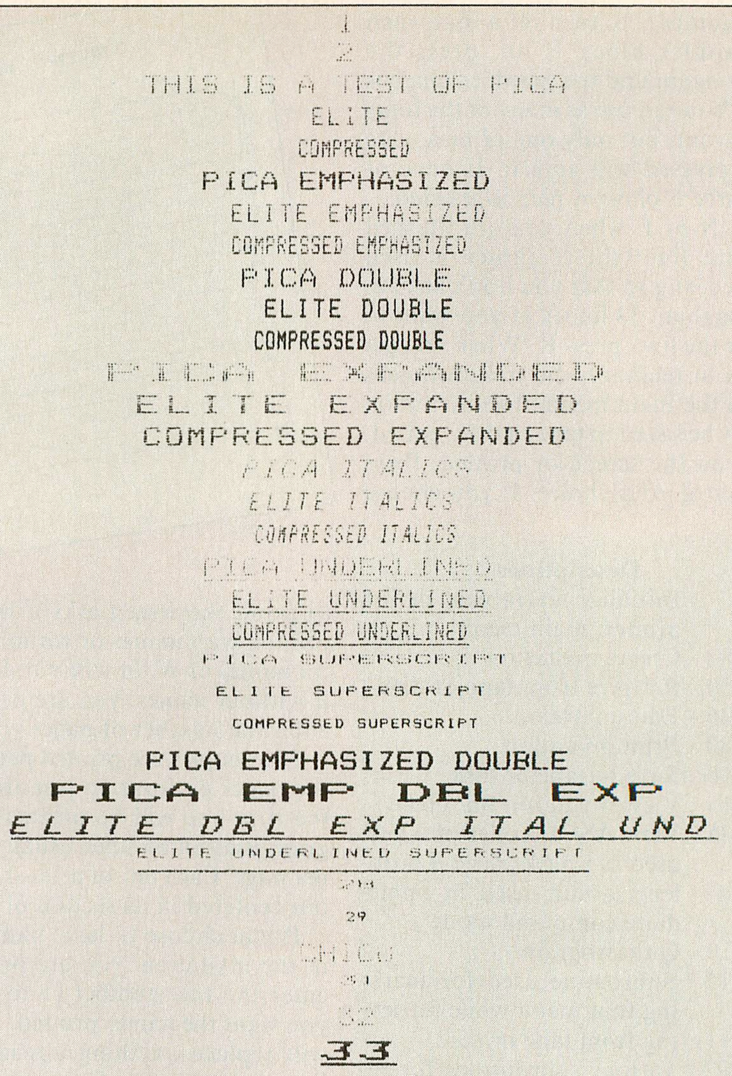
```
9015 F$(5,1)=E$+CHR$(29):F$(5,0)
=E$+CHR$(19):FT$(5)="5 NLQ-ELITE.
```

To change one of the printer types, change one of the names in Line 25, then change the appropriate subroutine to the proper codes: Sub 8050 for DMP-105, Sub 9000 for DMP-130, and Sub 8000 for RX-80. If you want to speed up the program a little and you have Extended Color BASIC, change the following lines:

```
151 IF PEEK(P+T)=Z THEN IFL>38
THENLC=L:GOTO183ELSE P$=STRING$
(19-L/2,32):P1$=STRING$(40-L,32):
F(1,C)=1
154 IFPEEK(P+T*2)=Z THENLC=L/1.2:
IFLC>38THEN183ELSE P$=STRING$
(23-L/2):P$=F$(2,1)+P$:P1$=STRING$
(48-L,32):P2$=F$(2,0):F(2,C)=1
157 IFPEEK(P+T*3)=Z THENLC=L/1.
68:IFLC>38THEN183ELSEP$=STRING$
(32-L/2,32):P$=F$(3,1)+P$:P1$=
STRING$(69-L,32):P2$=F$(3,0):F
(3,C)=1
```

These changes exchange the slow `FOR/NEXT` loops for the Extended function `STRING$`. Listing 2 is a short program for printing a worksheet for developing the text and choices. (See Figure 1.)

(Questions or comments concerning this article may be directed to the author at Box 790, Big Pine Key, FL 33043. Please include an SASE when requesting a reply.) □



```
1
2
THIS IS A TEST OF PICA
ELITE
COMPRESSED
PICA EMPHASIZED
ELITE EMPHASIZED
COMPRESSED EMPHASIZED
PICA DOUBLE
ELITE DOUBLE
COMPRESSED DOUBLE
PICA EXPANDED
ELITE EXPANDED
COMPRESSED EXPANDED
PICA ITALICS
ELITE ITALICS
COMPRESSED ITALICS
PICA UNDERLINED
ELITE UNDERLINED
COMPRESSED UNDERLINED
PICA SUPERSCRIPT
ELITE SUPERSCRIPT
COMPRESSED SUPERSCRIPT
PICA EMPHASIZED DOUBLE
PICA EMP DBL EXP
ELITE DBL EXP ITAL UND
ELITE UNDERLINED SUPERSCRIPT
28
29
CHICO
31
32
33
```

Table 3: Styles available using the Epson option

80	11	445	132
124	79	540	139
157	161	900	166
200	160	8025	47
315	134	END	248

Listing 1: INVITE

```
0 ' COPYRIGHT 1989  FALSOFT,INC
9 CLS:PRINT"     'invite'     BY
R.J.MCCORKLE      1-25-87
10 CLEAR3500:DIMN$(33),F(9,33),N
J$(33),F$(9,2),NN$(60)
15 Z=169:B=96:T=32:P=&H421
20 E$=CHR$(27)'PRNTR.ESCAPE CODE
22 FT$(1)="1 PICA":FT$(2)="2 ELI
TE":FT$(8)="8 UNDERLINE"
25 PRINT@196," A) DMP 105 PRINTE
R ";:PRINT@260," B) DMP 130 PRIN
TER ";:PRINT@324," C) EPSON RX-8
0 PRINTER ";
30 K$=INKEY$:IFK$<"A"ORK$>"C"THE
N30
35 ON INSTR(1,"ABC",K$)GOSUB8050
,9000 ,8000
40 CLS:PRINT" BAUD":PRINT:PRINT"
```

```
 1) 9600":PRINT" 2) 4800":PRINT"
 3) 2400":PRINT" 4) 1200":PRINT"
 5) 600"
45 K$=INKEY$:IFK$=""THEN45ELSEK=
VAL(K$):IFK<1ORK>5THEN45ELSEIFK=
1THENF=1ELSEIFK=2THENF=7ELSEIFK=
3THENF=18ELSEIFK=4THENF=40ELSEF=
87
50 POKE149,0:POKE150,F
75 CLS:PRINT"     'INVITE'  MAIN
MENU":PRINT
80 PRINT" C) CREATE INVITATION":
PRINT:PRINT" R) RETRIEVE FROM TA
PE/DISK":PRINT:PRINT" E) EDIT IN
VITATION":PRINT:PRINT" P) PRINT
INVITATION":PRINT:PRINT" S) SAVE
 ON TAPE/DISK":PRINT:PRINT" V) V
IEW INVITATION
82 PRINT:PRINT" Q) QUIT PROGRAM"
85 K$=INKEY$:IF K$="" THEN85
90 ON INSTR(1,"CREPSVQ",K$) GOTO
100,200,300,400,500,600,700:SOUN
D4,4:GOTO85
100 CLS3:PRINT"    CREATE INVITAT
ION":GOSUB900:IFK$="N"THEN75
102 CLS3
103 C=C+1:IF C=34 THEN PRINT"END
 OF INVITATION SPACE":C=33:GOSUB
960:GOTO75
106 LC=0:PRINT"LINE"C;:INPUT N$(
C)
109 IF N$(C)="" THEN NJ$(C)="":G
OTO103
112 CLS3:PRINTC;:PRINTN$(C):L=LE
N(N$(C))
115 PRINT@64,"";:FORF=1 TO 9:PRI
NTFT$(F):NEXTF
118 PRINT"n NEXT LINE":PRINT"e E
ND":PRINT"R RE-ENTER LINE
121 ONW GOTO 315,805
124 K$=INKEY$:K=VAL(K$):IF K$=""
 THEN124
127 IF K$="R" THEN106
130 Q=P+K*32:IF PEEK(Q)=B THEN P
OKEQ,Z ELSE POKEQ,B 'MARK MENU
133 IF K=1 THENPOKEQ+T,B:POKEQ+6
4,B
136 IF K=2 THENPOKEQ-T,B:POKEQ+T
,B
139 IF K=3 THENPOKEQ-64,B:POKEQ-
T,B
142 IF PEEK(P+T)<>Z AND PEEK(P+6
4)<>Z AND PEEK(P+B)<>Z THEN POKE
P+T,Z
145 IF K$<>"E" AND K$<>"N" THEN1
24
148 IF PEEK(P+192)=Z THEN L=L*2
150 FORF=1TO9:F(F,C)=0:NEXTF
151 IF PEEK(P+T)=Z THEN IFL>38TH
ENLC=L:GOTO183 ELSE FORF=1TO19-L
/2:PRINT@458,F;:P$=P$+" ":NEXTF:
```

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```
FORF=1TO40-L:PRINT@458,F;:P1$=P1
$+" ":NEXTF:F(1,C)=1
154 IFPEEK(P+T*2)=Z THENLC=L/1.2
:IFLC>38THEN183ELSEFORF=1TO23-L/
2:PRINT@458,F;:P$=P$+" ":NEXTF:P
$=F$(2,1)+P$:FORF=1TO48-L:PRINT@
458,F;:P1$=P1$+" ":NEXTF:P2$=F$(
2,0):F(2,C)=1
157 IFPEEK(P+T*3)=Z THENLC=L/1.6
8:IFLC>38THEN183ELSEFORF=1TO32-L
/2:PRINT@458,F;:P$=P$+" ":NEXTF:
P$=F$(3,1)+P$:FORF=1TO69-L:PRINT
@458,F;:P1$=P1$+" ":NEXTF:P2$=F$
(3,0):F(3,C)=1
160 IF PEEK(P+T*4)=Z THEN P$=F$(
4,1)+P$:P2$=P2$+F$(4,0):F(4,C)=1
163 IF PEEK(P+T*5)=Z THEN P$=P$+
F$(5,1):P2$=P2$+F$(5,0):F(5,C)=1
166 IF PEEK(P+T*6)=Z THEN P$=P$+
F$(6,1):P1$=F$(6,0)+P1$+F$(6,1):
P2$=P2$+F$(6,0):F(6,C)=1
169 IF PEEK(P+T*7)=Z THEN P$=P$+
F$(7,1):P2$=P2$+F$(7,0):F(7,C)=1
172 IF PEEK(P+T*8)=Z THEN P$=P$+
F$(8,1):P1$=F$(8,0)+P1$+F$(8,1):
P2$=P2$+F$(8,0):F(8,C)=1
175 IF PEEK(P+T*9)=Z THEN P$=P$+
F$(9,1):P2$=P2$+F$(9,0):F(9,C)=1
178 NJ$(C)=P$+N$(C)+P1$+N$(C)+P2
$
181 P$="":P1$="":P2$="":IF N$(C)
="" THEN NJ$(C)=""
183 IFLC>38THENPRINT:PRINT"THIS
LINE IS TOO LONG":PRINT"ENTER IT
 AGAIN (TRY USING COMP.)":GOSUB9
60:CLS3:PRINTN$(C):PRINT:GOTO106
184 ONW GOTO 330,815
187 IF C=33 THEN75 ELSE102
200 CLS3:PRINT"   RETRIEVE FROM
TAPE/DISK":GOSUB900:IFK$="N"THEN
75
203 GOSUB940:IFK$="D"THEN230
205 PRINT:PRINT"POSITION TAPE":P
RINT:PRINT"PRESS play":PRINT:GOS
UB990:IFNI$="S"THEN200ELSEGOSUB9
95
210 OPEN"I",-1,NI$
215 IF EOF(-1) THEN225
220 C=C+1:INPUT#-1,N$(C),F(1,C),
F(2,C),F(3,C),F(4,C),F(5,C),F(6,
C),F(7,C),F(8,C),F(9,C):GOSUB800
:GOTO215
225 CLOSE:CLS7:PRINT"PRESS STOP"
:PRINT:GOSUB960:GOTO75
230 CLS3:PRINT" INSERT DISK IN D
RIVE 0":PRINT:GOSUB980:IFNI$="S"
THEN200
235 OPEN"I",1,NI$+"/INV":GOSUB99
5
240 IF EOF(1) THEN250
245 C=C+1:INPUT#1,N$(C),F(1,C),F
```

```
(2,C),F(3,C),F(4,C),F(5,C),F(6,C
),F(7,C),F(8,C),F(9,C):GOSUB800:
GOTO240
250 CLOSE1:PRINT:GOSUB960:GOTO75
300 CLS3:PRINT"     EDIT INVITAT
ION":GOSUB900:IFK$="N"THEN75
305 W=1:FOR C=1 TO 33
310 NJ$(C)="":GOTO112
315 FOR J=1 TO 9:IF F(J,C)=1 THE
N POKEP+32*J,Z
320 NEXTJ
325 GOTO124
330 IFK$="E"THENC=33
335 NEXTC:W=0:GOTO75
400 CLS3:PRINT"    PRINT INVITAT
ION":GOSUB900:IFK$="N"THEN75
402 IFC=0THENPRINT:PRINT" THERE
IS NO INVITATION IN YET":PRINT:G
OSUB960:GOTO75
405 PRINT"ALLIGN PAPER PERFORATI
ON":PRINT"WITH TOP OF PRINT LINE
"
410 PRINT:PRINT" N) NAMES  OR  W
) WITHOUT NAMES"
415 K$=INKEY$:IFK$=""THEN415 ELS
EONINSTR(1,"NW",K$)GOTO425,465:S
OUND4,2:GOTO415
425 CLS3:INPUT"ON WHAT LINE NUMB
ER DO YOU WANT THE NAME TO APPEA
R (1-33)";LN:IFLN<1ORLN>33THEN42
5
430 H=H+1:INPUT"NAME OR xx TO EN
D";NN$(H):IF NN$(H)<>"XX" THEN43
0
435 NN$(H)="":H=H-1:IF H/2<>INT(
H/2) THEN H=H+1
440 CLS3:PRINT@233,"PRINTING";
445 FORJ=1 TO H/2:T$="":T1$="":F
ORF=1TO19-LEN(NN$(J))/2:T$=T$+CH
R$(32):NEXTF
447 FORF=1TO40-LEN(NN$(J))/2-LEN
(NN$(J+H/2))/2:T1$=T1$+CHR$(32):
NEXTF
448 NJ$(LN)=T$+NN$(J)+T1$+NN$(J+
H/2)
450 FOR D=1 TO 33:PRINT#-2,NJ$(D
):NEXT D
455 NEXTJ
460 GOTO75
465 CLS3'   PRINT NO NAMES
470 INPUT"HOW MANY PAGES";A:PRIN
T:PRINT"PRINTING"
475 FORG=1 TO A*2:FORJ=1 TO 33:P
RINT#-2,NJ$(J):NEXTJ:NEXTG
480 GOTO75
500 CLS3:PRINT"   SAVE TO TAPE/D
ISK":GOSUB900:IFK$="N"THEN75
503 GOSUB940:IFK$="D"THEN540
505 PRINT"POSITION TAPE":PRINT:P
RINT"PRESS PLAY & RECORD":PRINT
510 GOSUB990:IFNI$="S"THEN500
515 OPEN"O",-1,NI$
520 GOSUB997
525 FORJ=1 TO 33:PRINT#-1,N$(J),
F(1,J),F(2,J),F(3,J),F(4,J),F(5,
J),F(6,J),F(7,J),F(8,J),F(9,J):N
EXTJ
530 CLOSE:CLS0:PRINT"PRESS STOP"
:PRINT:GOSUB960:GOTO75
540 PRINT"DISK":GOSUB980:IFNI$="
S"THEN500
545 OPEN"O",1,NI$+"/INV":FORJ=1
TO 33:PRINT#1,N$(J)CHR$(13);:FOR
G=1TO9:PRINT#1,F(G,J)CHR$(13);:N
EXTG:NEXTJ
550 CLOSE:GOTO75
600 CLS3:PRINT"   VIEW INVITATIO
N":GOSUB900:IFK$="N"THEN75
605 FORJ=1TO33:IF LEN(N$(J))<31
THENPRINTTAB((32-LEN(N$(J)))/2);
610 PRINTN$(J):FORG=1TO200:NEXTG
:NEXT
615 GOSUB960:GOTO75
620 CLS3'    DESK CHECK STRING
625 INPUT"LINE #";U
630 FORFJ=1 TO LEN(NJ$(U)):PRINT
ASC(MID$(NJ$(U),FJ,1));:NEXTFJ
635 GOTO625
```

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```
700 CLS:PRINT:PRINT" DO YOU WANT
 TO SAVE THE":PRINT:PRINT"  INVI
TATION ? ";:GOSUB910:IFK$="N"THE
NSTOP
710 GOTO500
800 W=2:NJ$(C)="":GOTO112
805 FORJ=1TO9:IFF(J,C)=1THEN POK
EP+32*J,Z
810 NEXTJ:GOTO148
815 W=0:RETURN
900 PRINT:PRINT"    CONTINUE ?";
910 PRINT"  Y / N"
915 K$=INKEY$:IFK$<>"Y"ANDK$<>"N
"THEN915ELSERETURN
940 PRINT:PRINT" T = TAPE      D
= DISK"
950 K$=INKEY$:IFK$<>"T"ANDK$<>"D
"THEN950ELSERETURN
960 PRINT"  HIT ANY KEY TO CONTI
NUE":EXEC44539:RETURN
980 PRINT
990 PRINT:PRINT" ENTER NAME OF I
NVITATION OR":PRINT"  ENTER 'S'
TO STOP":PRINT:INPUTNI$:RETURN
995 C=0:CLS3:PRINT@198," RETRIEV
ING ";
996 PRINT@265,NI$;:PRINT@320,"";
:RETURN
997 CLS3:PRINT@198," RECORDING "
;:GOTO996
8000 '  EPSON RX-80
8005 F$(1,1)="":F$(1,0)=""  'PIC

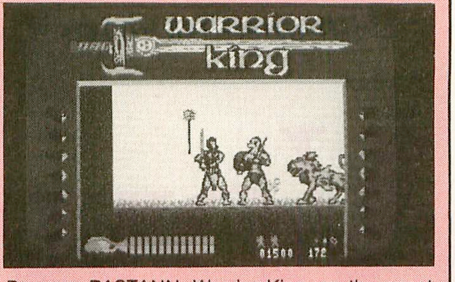
A
8010 F$(2,1)=E$+"M":F$(2,0)=E$+"
P"  'ELITE
8015 F$(3,1)=E$+"F"+CHR$(15):F$(
3,0)=CHR$(18):FT$(3)="3 COMPRESS
ED"
8020 F$(4,1)=E$+"E":F$(4,0)=E$+"
F":FT$(4)="4 EMPHASIZED"
8025 F$(5,1)=E$+"G":F$(5,0)=E$+"
H":FT$(5)="5 DOUBLESTRIKE"
8030 F$(6,1)=CHR$(14):F$(6,0)=CH
R$(20):FT$(6)="6 EXPANDED"
8035 F$(7,1)=E$+"4":F$(7,0)=E$+"
5":FT$(7)="7 ITALICS"
8040 F$(8,1)=E$+"-1":F$(8,0)=E$+
"-0"' UNDERLINE
8045 F$(9,1)=E$+"S0":F$(9,0)=E$+
"T":FT$(9)="9 SUPERSCRIPT"
8047 RETURN
8050 '   DMP 105
8055 F$(1,1)=E$+CHR$(19):F$(1,0)
="" '      PICA
8060 F$(2,1)=E$+CHR$(23):F$(2,0)
=E$+CHR$(19)'         ELITE
8065 F$(3,1)=E$+CHR$(20):F$(3,0)
=E$+CHR$(19):FT$(3)="3 CONDENSED
"
8070 F$(4,1)=E$+CHR$(31):F$(4,0)
=E$+CHR$(32):FT$(4)="4 BOLD"
8075 F$(5,1)="":F$(5,0)="":FT$(5
)=""
8080 F$(6,1)=E$+CHR$(32)+E$+CHR$
(14):F$(6,0)=E$+CHR$(15):FT$(6)=
"6 ELONGATED"
8090 F$(8,1)=CHR$(15):F$(8,0)=CH
R$(14)'  UNDERLINE
8095 F$(9,1)="":F$(9,0)="":FT$(9
)=""
8097 RETURN
9000 GOSUB8050'     DMP 130
9005 F$(9,1)=E$+CHR$(83)+CHR$(0)
:F$(9,0)=E$+CHR$(88):FT$(9)="9 S
UPERSCRIPT"
9010 F$(7,1)=E$+CHR$(66)+CHR$(1)
:F$(7,0)=E$+CHR$(66)+CHR$(0):FT$
(7)="7 ITALICS"
9015 F$(5,1)=E$+CHR$(18):F$(5,0)
=E$+CHR$(19):FT$(5)="5 NLQ-PICA"
9020 RETURN
```

Listing 2: INVIFORM

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 ' 'INVIFORM'  R.J.MCCORKLE 12
-15-86
20 CLS:PRINT:PRINT"  INVITE FORM
 PRINTING PROGRAM FOR RX80"
30 PRINT:PRINT:PRINT"   GET THE
PRINTER READY"
40 PRINT:PRINT:PRINT"   HIT ANY
KEY WHEN READY"
50 EXEC44539
60 PRINT#-2,"
                  PICA ELITE COMP
EMPH DBL EXP ITALIC UNDR SUP"
70 FOR F=1 TO 33
80 PRINT#-2,F" ----------------
-----------  1--  2--  3--  4-
-  5--  6--  7--  8--  9--"
90 NEXT F
100 ' FOR DMP130 CHANGE DBL TO B
LD AND EXP TO NLQ IN LINE 60
```

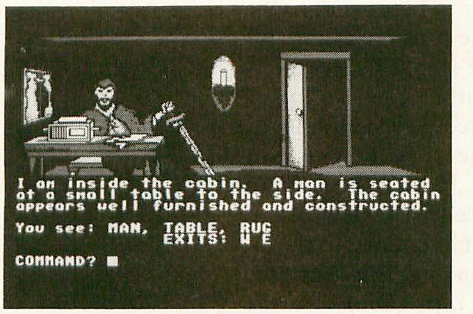
SUNDOG SYSTEMS

Warrior King



Become RASTANN, Warrior King, on the quest to regain his rightful crown, hidden deep within a sinister land. Battle monsters, gain magic and weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. From the creator of *Kung-Fu Dude* comes this awesome arcade game for the CoCo III! *Warrior King* uses the most detailed 320x200 16 color graphics and high speed machine code to vault you into a world of fantasy. Dare ye challenge the many perils ahead in order to become WARRIOR KING? Req. 128K CoCo III, disk drive, and joystick. Only $29.95.

In Quest of the Star★Lord



```
I am inside the cabin.  A man is seated
at a small table to the side.  The cabin
appears well furnished and constructed.

You see: MAN, TABLE, RUG
          EXITS: N E

COMMAND? ■
```

This is THE graphic adventure for the CoCo III! Unparalleled 320x200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. *In Quest of the Star Lord* is a full 4 disk sides of mind-numbing adventure! Req. 128K CoCo III and disk drive. Only $34.95. Hint Sheet: $3.95.

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Kung-Fu Dude

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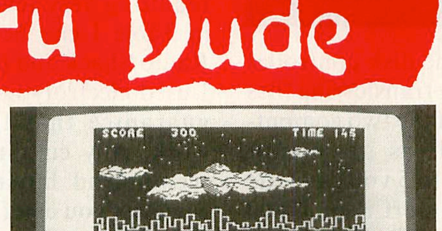
"The CoCo karate gap has been filled and Kung-Fu Dude *does it excellently. I highly recommend it!"*
— 2/88 Rainbow review



All programs CoCo 1, 2, 3 compatible, unless otherwise stated

HALL of the KING TRILOGY

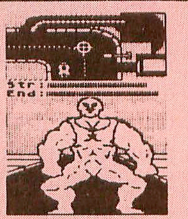
The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available! A total of six disks of intense graphic adventure will have you playing for weeks! Each section is a two-disk stand alone adventure, but all three together form an epic saga. Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for $29.95, the lowest price ever, or you can purchase the entire set for only $74.95! Req. 64K CoCo and disk drive.

"One of the best adventures I have experienced to date!" — 6/86 Rainbow review

"The animated graphics are dramatic, detailed, and excellent!" —11/87 Rainbow review

"The adventure of a lifetime. Don't miss out!"
— 7/88 Gamer's Connection review

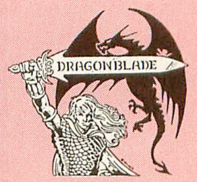
CHAMPION



Become a superhero in this unique 64K action adventure. Great graphics and sound effects! See 5/87 Rainbow review. Disk $19.95.

DRAGONBLADE

Another great 64K animated adventure! Can you obtain the enchanted sword to slay the evil dragon? See 11/86 Rainbow review. Disk $19.95.



WHITE FIRE OF ETERNITY!

Enter the era of monsters and magic in this splendid 64K animated adventure! See 12/86 Rainbow review. Disk $19.95.

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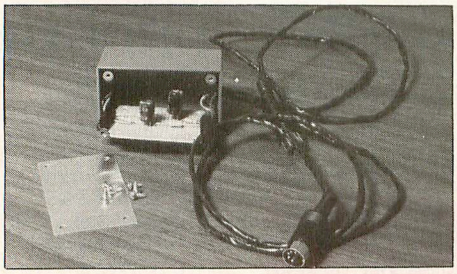
Build this adapter to use two CoCos
with one disk drive

Wow!

One Disk Drive, Two CoCos

By Jeff Baier

For many CoCo 3 buyers, their purchase means stashing away the CoCo 2, leaving it untouched in the dark corner of a closet to gather dust. After all, most folks usually have only one disk drive, and it is now plugged into the CoCo 3. Well, the time has come to fish out the old CoCo or even buy one.



You can now use one disk controller with two computers by transferring files via the cassette jacks of the two computers. It's not as simple as its sounds, though. The input is 1 to 5 volts and the output of the cassette port is only 800 mv. I first made an amplifier that would raise the 800-mv signal to the required 5 volts, but the corresponding circuit did not work. This problem was eventually solved by removing the amplifier from the circuit.

Figure 1 shows how simple the circuit is. It has two distinct, identical sides. Resistors 1 and 2 are the most important components in the circuit, providing matching input impedance for the cassette output. They actually boost the ouput so much that the signal must be reduced a little prior to being sent to the other computer. The other resisters, R3 and R4, reduce the signal to the operating level of the other cassette input. C1 and C2 are used for coupling to prevent DC connection of the two computers. Finally, J1 and J2 are 5-pin DIN plugs referenced to a view of the port on the back of the CoCo. (If you have problems figuring this out, see *Introducing Your Color Computer*, the manual enclosed with your CoCo 3.)

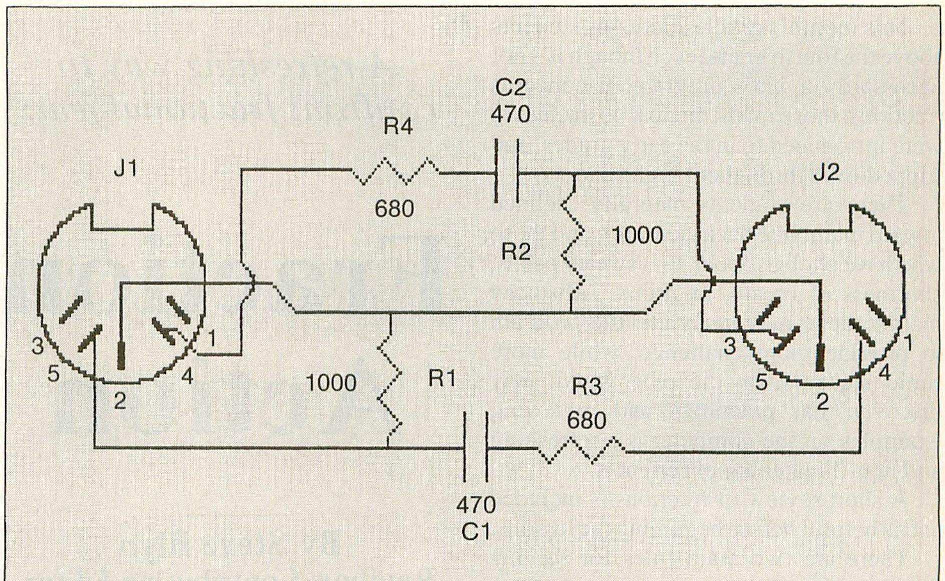
Construction of the adapter is easy, requiring very few parts. All the items in Table 1 can be found at your local Radio Shack and purchased at low cost. I used electrolytic capacitors and can't guarantee that film capacitors will work. Any circuit board will work. I recommend buying the smallest and cheapest you can find. When constructing the circuit, give yourself enough wire to make the distance between your computers. Also, be sure the wire you use gets wrapped together from the plug to the circuit board. This will save you a lot of problems by preventing a spaghetti of wires from collecting behind your computers. Four-conducter phone cable will eliminate this problem, too.

After constructing the adapter, there is not much more to know before transferring programs from one to the other. Loading and saving files can be broken into three categories: 1) BASIC programs, 2) machine code and 3)

Jeff Baier is an electronics technician who lives in Ballston Lake, New York. In his spare time, he likes building small circuits and writing programs for himself and his family.

interfacing the computers with `OPEN` and `CLOSE` statements.

Have the adapter plugged into both CoCos and your disk drive plugged in to the CoCo 3 and we will transfer to CoCo2. (BASIC programs are some of the easiest to load as long as they don't interface with disk files or load other programs.) To transfer a program, load it from disk to your CoCo 3. Once the program is loaded, go to your CoCo 2 and type `CLOAD` and then press ENTER. Now go to your CoCo 3 and type `CSAVE`. It's that simple. After a short time the program will be in your CoCo 2's memory, and you can run it. Then you can go back to work on your CoCo 3.



Note: All capacitance in micro-farads; all resistance in ohms

Figure 1

Part	Quantity
capacitor 470uf	2
resistor 680ohm	2
resistor 1000ohm	2
ckt board	1
5-pin	2
wire	as required

Table 1: Parts List

Machine-language programs are a bit more complicated. In order to save a machine-language program, you must know its start, end and execution addresses. This is not a big problem if you wrote the program yourself. If not, read the disk one byte at a time to figure out those three addresses. [For more information see "Follow The Bread Crumbs" (February 1988, Page 108), by Dennis Weide.] Then type `CLOADM` on your CoCo 2 and use the `CSAVEM`*" filename"*, *Start*, *End*, *Execute* command on your CoCo 3 to send a machine-language program to it. Autoexecuting programs, however, do not provide for any BASIC statements except the `LOADM` and then the program takes over. I have not come up with a solution for this problem yet but am working on it.

The last category is interfacing two computers. This is simple as long as you try to open a file on the reading computer prior to trying to open it on the sending computer. The reading computer will wait for a file to be present, while the sending computer assumes that its writing media is ready. Once the file is open, the same rule applies. Use timing loops between reads that ensure it.

Once you start transferring files, you'll be amazed at the uses. One example is an interactive game, written in BASIC, between two computers that pits two people against each other. You can transfer any variable used by either computer. This tends to program a lot easier than a null modem. Keep in mind, too, that this project will work for transferring files between any two CoCos.

I plan to come up with some software to utilize this option more fully as well as speed it up. It's a little work for a real bargain. ☐

(Questions or comments regarding this project may be directed to the author at 6A Premont Way, Balstar Lake, NY 12019. Please enclose an SASE when requesting a reply.)

THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum). Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

THE BOOK - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jystk, sound, serial port, and using cassette and disk. **$18.00 + $1.50 s/h.**

THE ADDENDUM - Picks up where the BOOK left off. Describes ALL the CoCo 3 enhancements & how to use them with assembly language. The most complete GIME spec. WOW - Super-Res Graphics, Virtual Memory, New Interrupts, and more information not available elsewhere. Find out what the CoCo 3 can really do. **$12.00 + $1.00 s/h.**

COCO 3 SPECIAL Start your CoCo library right. See what the CoCo can really do and save money - buy the BOOK and ADDENDUM for only **$27.00 + $2.00 s/h.**

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A refreshing way to confront fractional fears

Fraction Action

By Steve Blyn
Rainbow Contributing Editor

This month's article addresses students above the fourth grade level, though it's not necessarily a kid's program. It concerns fractions, those mathematical obstacles we were introduced to in the early grades, and tripped over throughout high school.

There are students naturally inclined toward math, like ducks to water; and those who have phobias about it — sweaty palms, shortness of breath, migrains. Advanced math students may easily alter this program to provide more challenge, while more timid students, on the other hand, may discover that practicing and reviewing examples on the computer is a refreshing and non-threatening experience.

A short review of fractions is included and is helpful before beginning the lessons.

There are two main rules for solving these problems.

Principle 1: If fractions have the same numerator, the fraction with the smallest denominator has the greater value. For example:

3/5 is greater than 3/7
4/9 is less than 4/5

Principle 2: If fractions have the same denominator, the fraction with the larger numerator is the greator. For example:

7/10 is greater than 3/10
3/8 is less than 5/8

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

Most of the time, the fractions will not immediately fall into either of the above categories. To compare the value of such fractions, both must have common denominators. This new denominator should be a number which both of the original denominators will divide into evenly. One possible denominator can always be found by finding the product of the two original denominators. For example:

Compare 2/3 and 4/5. A common denominator is the product of 3 and 5, which is 15. Therefore:

2/3 = 10/15 and 4/5 = 12/15

Since 12 is greater than 10, 4/5 is greater than 2/3.

Also included is a third rule, which is really a shortcut that I teach to more advanced students. By examination, one of the fractions may clearly be less than 1/2 and the other clearly greater. For example, 3/7 is less than 1/2 since half of seven is three and one half. Seven-tenths is more than 1/2 since half of ten is five. Thus, 3/7 is determined to be less than 7/10 by this inspection alone.

The program contains 10 examples of how to compare fractions. The student determines if the two fractions are equal or whether one is greater than the other. To indicate an answer, press the =, < or > sign on the keyboard. After the 10th example is completed, a scorecard is displayed, helping the student keep track of progress. Lines 280 and 290 may be deleted if you prefer to omit scoring.

The student can work out problems mentally or on paper. Because the denominators are no larger than tenths, after practice, it should be easy to work them out mentally. To increase or decrease the range, simply change the random limits of the four variables `A`, `B`, `C` and `D` accordingly.

The Listing: `FRACTION`

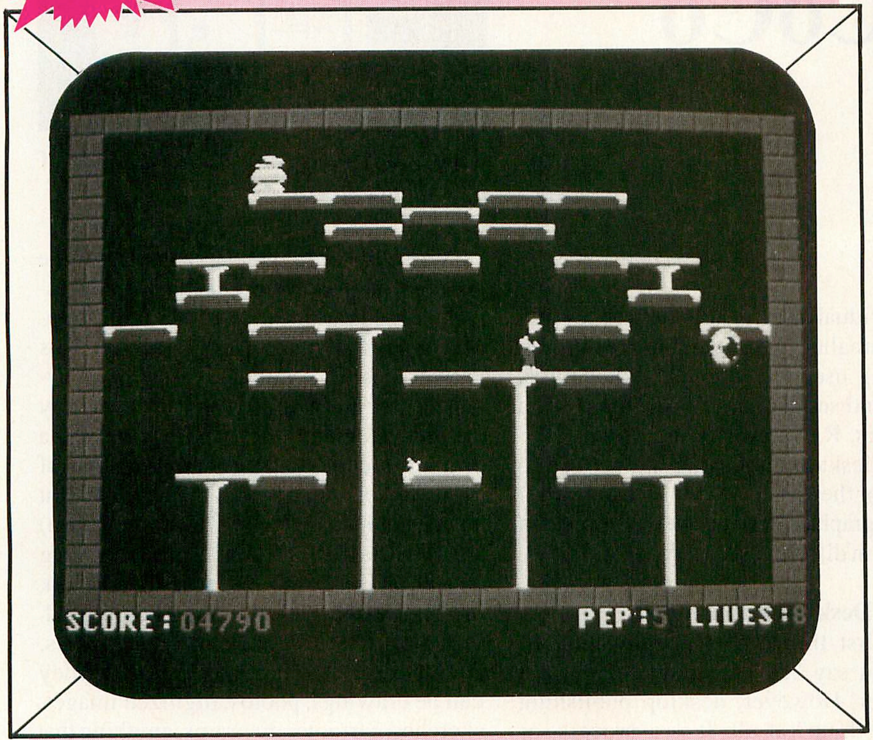
```
10 REM"COMPARING FRACTIONS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1989"
30 CLS0:CT=CT+1
40 IF CT=11 THEN 280
50 PRINT@6,"COMPARING  FRACTIONS
";
60 PRINT@64,"PLACE THE RIGHT SIG
N IN THE BOX.";
70 PRINT@133,"USE EITHER < OR >
OR =";
80 A=RND(6):B=RND(6)
90 C=A+RND(4):D=B+RND(4)
100 PRINT@264,A;:PRINT@276,B;
110 PRINT@296,"---";:PRINT@308,"
---";
120 PRINT@328,C;:PRINT@340,D;
130 FOR T= 1260 TO 1266:POKE T,2
04:NEXT T
140 FOR T=1388 TO 1394:POKE T,19
5:NEXT T
150 FOR T=1260 TO 1388 STEP 32:P
OKE T,197:NEXT T
160 FOR T=1266 TO 1394 STEP 32:P
OKE T,202:NEXT T
170 PRINT@303,"?";
180 EN$=INKEY$
190 IF EN$=">" OR EN$="<" OR EN$
="=" THEN 200 ELSE 180
200 PRINT@303,EN$;
210 E=A/C:F=B/D
220 IF E=F THEN A$="=" ELSE IF E
>F THEN A$=">" ELSE A$="<"
230 IF EN$=A$ THEN PRINT@428,"CO
RRECT";:RT=RT+1
240 IF EN$<>A$ THEN PRINT@421,"S
ORRY,";A$;" IS THE ANSWER";
250 PRINT@484,"PRESS ENTER TO CO
NTINUE";
260 E$=INKEY$
270 IF E$=CHR$(13) THEN 30 ELSE
260
280 CLS:PRINT@10,"SCORECARD";
290 PRINT@96,"YOUR SCORE THIS RO
UND WAS";RT*10;"%"
300 PRINT@192,"PRESS e TO END OR
 g TO GO AGAIN"
310 G$=INKEY$
320 IF G$="E" THEN 330 ELSE IF G
$="G" THEN RUN ELSE 310
330 CLS:END
```

GAME POINT
SOFTWARE

THIS MONTHS

NEW

Feature



Rupert Rythym

by Nickolas Marentes

Help Rupert infiltrate "Music Box Records" and collect all of his stolen notes which are scattered throughout the complex. Ride the crazy elevators and beware of the security robots on patrol.

Rupert Rythym is a strategy arcade game featuring 17 different, 16 color graphic screens and some of the hottest digitized percussion music and vocals you've ever heard on your Tandy Color Computer 3.

Available on Disk or Tape. . .$24.95

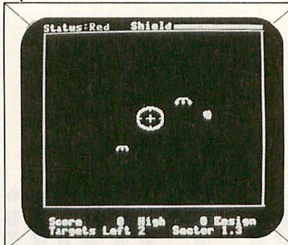
ALL PROGRAMS REQUIRE A COLOR COMPUTER 3 DISK OR TAPE SYSTEM.

Personal checks, money orders, and American C.O.D. orders accepted. Include $3.00 for S/H. $2.50 extra for C.O.D. orders. (Cal. res. add 6.5 % tax.)

ATTENTION PROGRAMMERS: Game Point Software is looking for talented writers. Top royalties guaranteed.

WARP FIGHTER 3-D

by Steve Bjork



Blast in to Hyper-Drive with this fun-filled starship shoot-em-up! You'll have a captains' eye view out of your 3-D cockpit as you try to rid the galaxy of the evil enemy forces. Game includes 3-D glasses and works on any Color T.V., Composite or RGB monitor.

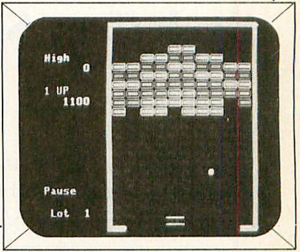
$24.95
(Extra Glasses $2.95)

bash

by Steve Bjork

Based on a popular arcade game which we can't mention (But sounds like "Art Gannoyed"). BASH challenges you to clear the screen by "BASHING" your ball through multiple brick layers. Of course you'll have help getting through this 20 level game by activating options like, Slow Ball, Expanded Paddle, Multi-Ball, and more!

$24.95



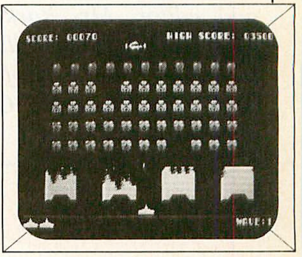
NEW

SPACE INTRUDERS

by Nickolas Marentes

Enemy alien creatures have been identified entering our solar system, their destination: our home planet! Their goal: the total annihilation of our race. They must not be allowed to land! An action arcade game featuring high quality 16 color graphics and sound effects.

$24.95

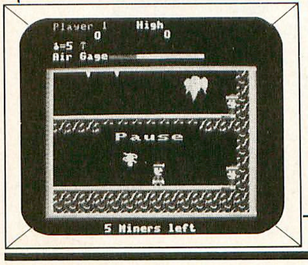


MINE RESCUE

by Steve Bjork

A terrible mine disaster has just occured and it will be up to you and your talents to enter the mine, jump the pits, avoid the spikes, fight off the bats and other creepy crawlers and get air to the needy victims. Mine rescue features over 2 megabytes of arcade-style graphics, real time music and multiple mine levels.

$24.95



GAME POINT
SOFTWARE

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Desktop Publishing Comes to the CoCo

By Jeffrey S. Parker

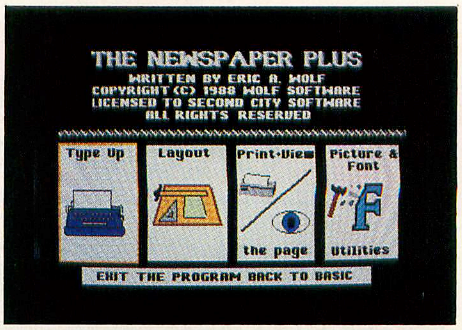
In 1984, with the introduction of the Macintosh, desktop publishing became an affordable reality for both businesses and the individual user. The CoCo, busy becoming smaller outside and bigger inside, was being used for graphics, adventures, arcades and simulations, full-featured word processors, RAINBOWfests and more.

Jeffrey S. Parker has been involved with computers since 1976 and CoCos since 1981. He is the Director of Computer Education at The Parker Academy in Sudbury, Massachusetts. He is also a lecturer at Northeastern University in technical communications. A noted freelance writer and editor, Mr. Parker is a Certified Computer Professional and holds degrees from The University of Massachusetts at Amherst and Trinity College of Oxford University in England.

Now desktop publishing has arrived in earnest for the CoCo. Not only can we print fabulous graphics designs, we can mix them with text in different styles,types and sizes.

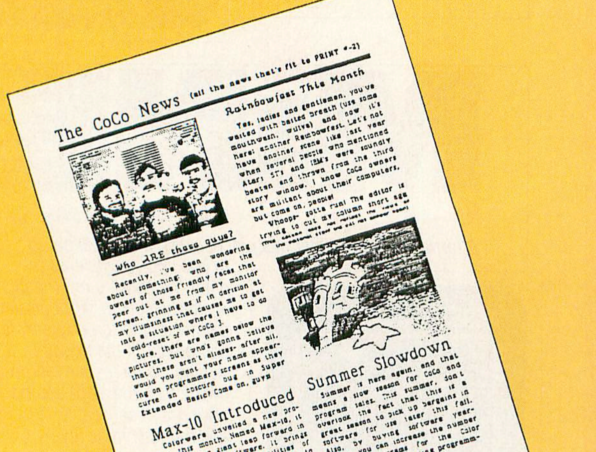
What is Desktop Publishing?

The first thing most people think of when you say "desktop publishing" is a newsletter. However, desktop publishing is not a "thing" at all. It is a process, or series of processes by which we arrive at a printed, or "published" document, produced on a personal computer. The format is most likely arranged in a columnar format, containing a series of graphic images (pictures, charts or designs) that have been integrated into the body of the document along with the text. (See this and the following page for samples.)



The colorful, menu-driven display of *Newspaper Plus*.

These are only typical examples of the concept of desktop publishing. Let's assume for this article that this is our description of desktop publishing. Cut down to its very basics, it is publishing using a personal computer. Publishing involves many different elements, the overall goal being a printed document. Typesetting is one of those key elements. Both the type of print (font) and its height and width (point size) are important too. Layout, or positioning on a page, is also important and must work in conjunction with the fonts being used. There is also the question of graphics. Graphics are anything other than text. They can be drawings, photos, digitized images, sketches, cartoons, diagrams, anything that is not pure text. Most desktop publishing



The CoCo News (all the news that's fit to PRINT #-2)

Rainbowfest This Month

Yes, ladies and gentlemen, you've waited with baited breath (use some mouthwash, wuive) and now it's here! another Rainbowfest. Let's not have another scene like last year when several people who mentioned Atari ST's and IBM's were soundly beaten and thrown from the third story window. I know CoCo owners are militant about their computers, but come on, people!

Whoops- gotta run! The editor is trying to cut my column short again

Who ARE these guys?

Recently, I've been wondering about something: who are the owners of those friendly faces that peer out at me from my monitor screen, grinning as if in derision at my dumbness that causes me to get into a situation where I have to do a cold-reset of my CoCo 3.

Sure, there are names below the pictures, but who's gonna believe that these aren't aliases- after all, would you want your name appearing on programmer's screens as they curse an obscure bug in Super Extended Basic? Come on, guys!

Max-10 Introduced

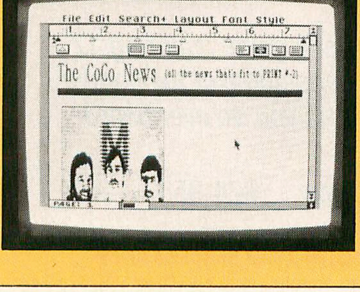
Colorware unveiled a new product this month. Named Max-10, it looks to be a giant leap forward in Color Computer software. It brings the revolutionary capabilities of true WYSIWYG word processing to the CoCo 3. Says Max-10's author Dave Stampe: "We're all tremendously excited by this product, and feel the CoCo users will be, too.

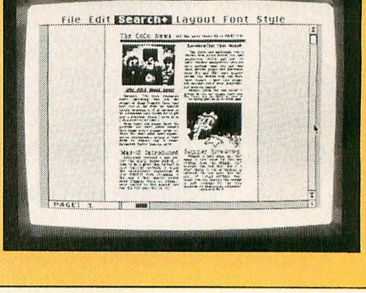
Summer Slowdown

Summer is here again, and that means a slow season for CoCo and program sales. This summer, don't overlook the fact that this is a great season to pick up bargains in software for use later this fall. Also, by buying software year-round, you can increase the number of new programs for the Color Computer by encouraging programm-

The Works

These samples were produced with the combined efforts of *CoCo Max III* and *Max-10*. The photos below (left) show the WYSIWYG display of *Max-10* and the full-page preview (right) of the sample document.


File Edit Search+ Layout Font Style
The CoCo News (all the news that's fit to PRINT #-2)
PAGE: 1



requires some form of artwork or graphics to make a completed document.

One of the great advantages of desktop publishing over word processing packages has been its ability to combine text with graphics and to create multiple columns on one page, like a newspaper.

Only a few years ago, there was no easy way to do that with the popular word processing packages available on the CoCo market. One had to obtain expensive software that was usually short on all the features that you needed, except that particular one of making columns. Now, many good word processing programs will do that relatively quickly and easily.

Columns alone are not enough though. The software must be flexible enough to wrap text around graphics within and outside columns, and even have blocks of text, such as headings, that are not within those columns. It's a tall order!

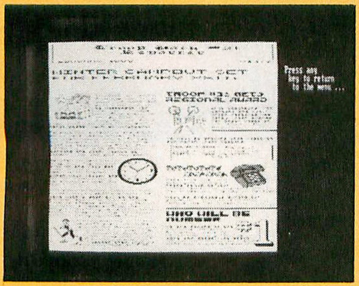
For serious desktop publishing, options supplied with many packages are rarely enough. There are a few more clip art images needed to get that special point across; one more font to make it perfect. So, if you want to use artwork or fonts from other packages, the import/export feature is needed, which allows you to import or export fonts, clip art and text to or from other programs.

But what if you want to incorporate text, fonts or graphics from a different computer, like a Macintosh or PC? Then you need the ASCII save/load feature as well. ASCII is the American Standard Code for Information Interchange and it allows any computer to save a file of a given font, text or graphics in ASCII format, so other computers with the ability to save ASCII files can read it.

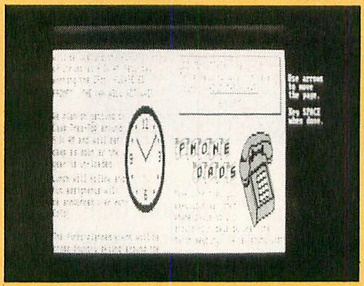
Just as important is the feature that allows you to see the finished document on screen before printing. WYSIWYG (pronounced wi-see-wig), an acronym for What You See Is What You Get, describes the process of viewing on screen — either continuously, or in the display mode — what your finished document will look like. How can this be done? The computer actually thinks of the screen as a device (printers, disk drives and modems are devices, too), so when you ask to view your document, the computer prints it to the screen instead of to the printer or to a file. No desktop publishing software is worth

Newspaper Plus

The Hi-Res preview option of *Newspaper Plus* (below, left) gives a full-page view of your work, but with some loss of text legibility. It is great, though, for getting a feel for what the document will look like. The Lo-Res option (below, right) increases legibility and allows scrolling through the document.

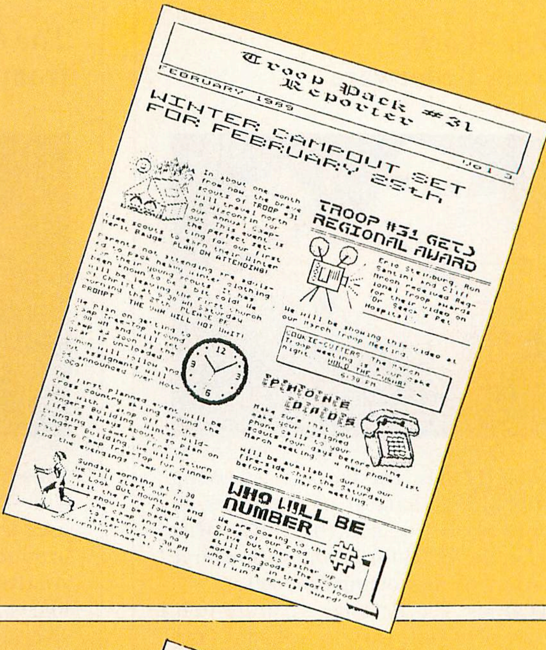


Press any key to return to the menu ...



Use arrows to move the page.

Hit SPACE when done.



Troop Pack #31 Reporter

FEBRUARY 1989

Vol 3

WINTER CAMPOUT SET FOR FEBRUARY 25th

In about one month from now the brave Scouts of TROOP #31 will travel north to Wisconsin for our annual Camp-out. This event is the perfect setting for our first time Scouts to earn their Winter Merit Badge. PLAN ON ATTENDING!

Parents not attending are advised to pack heavy winter clothing for their young scouts. It has been known to be a bit cold! We will be leaving the First Church of Christ at 5:30 AM Saturday morning the 25th. PLEASE BE PROMPT. THE VAN WILL NOT WAIT!

We plan on getting to Camp Tree-Top around 9:00 AM and will set up camp as soon as the gear is un-loaded. Lunch will follow and cot assignments will be announced over Hot-Coco!

The first planned event will be cross country skiing around the lake with a stop off at the Rangers Building. Winter wild-life is always about, so plan on bringing a camera. From the Rangers Building we will return back to Camp Tree-Top for dinner and the evenings camp fire.

Sunday morning at 7:30 we will start our hike up Look Out Mountain and visit the Fire Tower. We should be back at the camp and ready to return home no latter than 2:30 PM. Returning home at 5:00

TROOP #31 GETS REGIONAL AWARD

Eric Steinburg, Ron Santini and Cliff Hrech received Regional Troop awards for their video on Dr. Seeck's Pet Hospital.

We will be showing this video at our March Troop Meeting.

COOKIE-CUTTERS: The March Troop meeting is a Cup Cake night. HOLD THE SUGAR! 6:30 PM

PHONE DADS

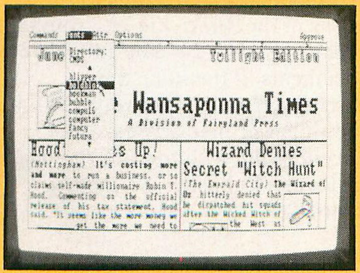
Make sure that you make your assigned phone calls to your Scouts four days before the March meeting. A new phone list will be available during our fire-side chat the Saturday before the March meeting.

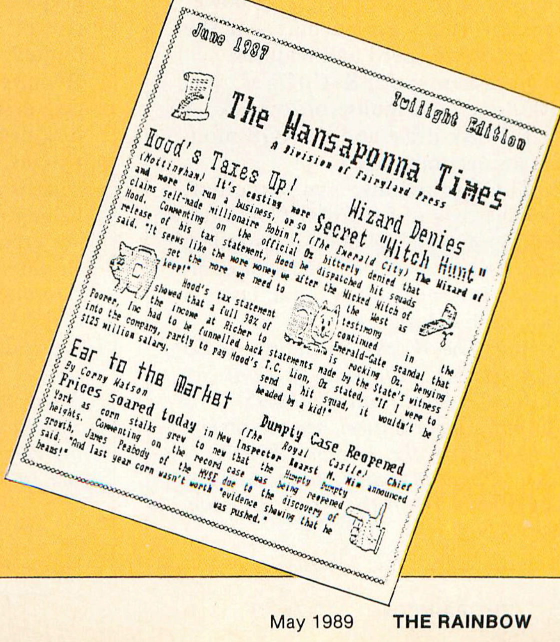
WHO WILL BE NUMBER

We are coming to the close of our Food Drive but there is still time to gather up more can goods. The scout who brings in the most food will win a special award!

Home Publisher

Tandy's *Home Publisher* is a popular desktop publishing package, especially among OS-9 addicts. At right is a sample printout from *Home Publisher*. The photo below shows the screen display of the same document. As with other recent software, *Home Publisher* makes extensive use of pull-down menus during document preparation.





June 1987

Twilight Edition

The Wansaponna Times

A Division of Fairyland Press

Hood's Taxes Up!

(Nottingham) It's costing more and more to run a business, or so claims self-made millionaire Robin T. Hood. Commenting on the official release of his tax statement, Hood said. "It seems like the more money we get the more we need to keep!"

Hood's tax statement showed that a full 98% of the income at Richer to Poorer, Inc had to be funnelled back into the company, partly to pay Hood's $125 million salary.

Wizard Denies Secret "Witch Hunt"

(The Emerald City) The Wizard of Oz bitterly denied that he dispatched hit squads after the Wicked Witch of the West as testimony continued in the Emerald-Gate scandal that is rocking Oz. Denying statements made by the State's witness T.C. Lion, Oz stated, "If I were to send a hit squad, it wouldn't be headed by a kid!"

Ear to the Market

By Corny Watson

Prices soared today in New York as corn stalks grew to new heights. Commenting on the record growth, James Peabody of the NYSE said. "And last year corn wasn't worth beans!"

Dumpty Case Reopened

(The Royal Castle) Chief Inspector Hearst M. Him announced that the Humpty Dumpty case was being reopened due to the discovery of evidence showing that he was pushed."

its salt without some form of this feature.

Lastly, and certainly quite important, is the actual printout of the document. The question here is not so much what kind of printer you have, but does the software communicate with or drive your printer? Of course, the type of printer you have will make a difference in the quality of the document and how fast you can print it.

If you intend to pursue desktop publishing, you cannot use a letter quality printer (LQP) such as one of the Tandy DWP series printers, also called daisy-wheel printers. A printer with a wheel or thimble-like print head can only print letter quality documents like a typewriter — no graphics, no fancy fonts. So be sure that you have a laser, color or dot-matrix printer.

Does the software need all of these features to be desktop publishing? No, not by some standards, but yes by mine.

The Power of the Printed Word

For the Color Computer there are only three packages that meet the criterion for complete desktop publishing packages — *The Works* from Colorware, *Newspaper Plus* from Second City Software and *Home Publisher* from Tandy.

The Works

The Works package includes *Max-10*, a full-featured word processor and *CoCo Max III*, a graphics creation program. Packaged together, it forms the most powerful desktop publishing package available for the Color Computer.

Max-10 has pull-down menus, dialog boxes, full mouse control and instant response. It has full-display capacity, a spell checker, text wrap, multiple columns, lock protection, global search and replace and the capability to import all types of files.

You can find out how much memory you have left by looking at the "gas gauge" type display. It is a good idea to check this before bringing in a graphics file, as memory goes quickly with all those pixels.

CoCo Max III, on the other hand, is a graphics design package that incorporates sophisticated text formatting capabilities, but is primarily designed for graphics design. It includes 28 tools, 16 colors, 14 initial fonts, plus template tools, from vertical arcs to the regular and irregular quadrilaterals, ellipses on and off, and your run-of-the-mill rays, boxes, circles, lines drawn in any width, animation and color cycling. *CoCo Max III* has graphics capabilities to paste files or pictures of nearly any type into the body of a document, resize the image and wrap text around it. You can import/export graphics files in almost any format you can name. It has 40 brush shapes

The Works
from Colorware

What It Does: *The Works* is a desktop publishing teamup of the *Max-10* word processor and the *CoCo Max III* graphics editor, along with a large variety of supporting font sets.
Analysis: This package is feature-rich, extremely fast, easy to use and has a true WYSIWYG display. It's a power package that can outperform the Macintosh in speed and features.
Requirements: 128K CoCo 3, one disk drive, and mouse or joystick. A second disk drive and an RGB monitor are recommended.
CoCoConclusions: An excellent package overall for Color Computer desktop publishing, but it is also three times as expensive as its nearest competitor. It is well-suited for ad layouts and graphic design.
Pricing: *The Works*, including *CoCo Max III*, *Max-10*, *Max-10 Font Set* and *CoCo Max Font3*, $149.95.

For more information, see the review of Max-10 *in the January '89* RAINBOW, *Page 118 and the review of* CoCo Max III *in the April '88 issue, Page 129.*

The Newspaper Plus
from Second City Software

What It Does: *The Newspaper Plus* is a desktop publishing program that uses a structured layout to let users produce newsletter-type documents.
Analysis: The program is easy to use and versatile. It is supported by extensive clip art and fonts. It includes a graphics conversion program, but the size of an image to be converted is limited.
Requirements: 128K CoCo 3 and one disk drive. An RGB monitor and two disk drives are recommended.
CoCoConclusions: *The Newspaper Plus* is a full-featured desktop publishing package that, on the whole, is very reliable.
Pricing: *The Newspaper Plus*, $48.95; *Graphics Disk I*, $19.95; *News Art* disks A through Z, $9.95 each or $100 for 26-disk set. Registered owners of *CoCo Newsroom* may upgrade to *Newspaper Plus* for $19.95.

For more information, see the upcoming review of The Newspaper Plus *in the July '89 issue of* THE RAINBOW.

Home Publisher
from Tandy

What It Does: *Home Publisher* is the only OS-9 desktop publishing software for the CoCo. No OS-9 experience is needed. It will run under *Multi-Vue*.
Analysis: It has flexible configuration, 14 fonts, 37 graphics images and 64 colors. The user interface for controlling screen viewing and text entry is a bit clumsy, and the program is somewhat limited. However, it is capable of impressive results.
Requirements: 128K CoCo 3 and one disk drive. Performance is enhanced with 512K RAM and a mouse or joystick. An RGB monitor is recommended.
CoCoConclusions: *Home Publisher* works in the *Multi-Vue* environment, which means you can edit several documents at the same time.
Pricing: *Home Publisher*, $39.95; additional printer drivers, $19.95.

For more information, see the review of Home Publisher *in the July '88* RAINBOW, *Page 122.*

and dozens of fill patterns that you can change or create.

CoCo Max III allows you to use hundreds of fonts, four disks full of them, plus what comes with the program, and any others you care to buy and translate to *CoCo Max III*. As part of *The Works* package, Colorware is offering the 100-font set for *CoCo Max III* at no extra cost, and the 36 *Max-10* fonts, as well.

As an option, color printer drivers are available for *CoCo Max III* for the Star NX-1000 Rainbow, the CGP-220 and Okimate 20 at $19.95 each. These will drive 125 colors in the above printers. Otherwise, the drivers included support IBM/Epson compatible; Radio Shack, including black and white CGP-220; Gemini; and Okidata 182/192 printers.

CoCo Max III includes and *requires* the use of a modified Hi-Res Interface for its operation. This allows fine control over the screen with a mouse or joystick. *Max-10* uses the modified interface, too, but also requires a hardware key ("clicker") to be plugged into the cassette port. This later item is a form of copy protection. Both the interface and the "clicker" are included with *The Works*.

The Works package gives more graphics, text, import and export capability, layout and text/graphics integration than any other software product for the CoCo.

It sounds as though *The Works* is like an MS-DOS desktop publishing system because it is modeled after one. It raises a serious question about why to buy a $2000 Macintosh with *Macwrite*, *MacPaint* and *MacPublish* just to match it. I like challenges, so I brought in a respected friend, who is a Mac user, and he nearly fell off his chair when I showed him *The Works*. He kept shaking his head and moaning quietly, "My Mac can't do that...no, it can't do that either."

But does this mean you should buy it? Not if all you want to do is make greeting cards and signs. If you don't need all that muscle, and you don't want to be an artist, there are other alternatives. I like to use this formula: The need must justify the cost. *The Works* is the best, but at $149.95, it is also the most expensive. Keep in mind what you want and need as you make your choices. If you want a more structured layout to work with than *Max-10* can give

The Men Behind the *Max*

Born in Paris, John Monin moved to the United States some 13 years ago. You could say he has a European perspective on marketing software: "I wouldn't buy junk, and I will not sell it," he says. "We spend the money until the product is to my satisfaction."

John has put his money where his mouth is in this case. With the introduction of *CoCo Max III* and *Max-10*, bundled together with extra font sets, Colorware has introduced what appears to be perfectionist's software — *The Works*.

Both *CoCo Max III* and *Max-10* were written by Dave Stampe, who tackled the projects in his early twenties but has since returned to school to pursue engineering degrees. According to Monin, Stampe would revise and revise the software until he was happy with it. Even after pronouncing a project finished, Stampe would spend a weekend writing and rewriting 100 pages of code, just to add one more feature. "I was really afraid that he'd burn out," said Monin. "But he really wanted to do his personal best, and he produced a program that is nearly perfect."

John Monin's pride in Dave Stampe is evident. "It is not how big a company you have, or how many people you have working for you — it is how thorough you are. We are really pleased at Colorware that *CoCo Max III* and *Max-10* are as good as they are."

Monin founded Colorware after the emergence of the Color Computer in 1982. Originally, his Alpha Products company supplied hardware interfaces like clocks and speech synthesizers for the TRS-80 Model I and III computers. When Monin saw the CoCo gaining in strength and popularity, his company went all out to produce quality products for it.

"Colorware was founded because I wanted to bring the products we had developed for the Model I and III to the Color Computer," John said, reflecting on the light pen interface and the Atari joystick adapter that were the company's first CoCo products.

CoCo Max and *CoCo Max II* were written by Tim Jenison. Tim left Colorware to strike out on his own after the development of *CoCo Max II* and is now developing products for Amiga computers.

Monin has pledged support to the CoCo Community, saying that "as long as there is a RAINBOW, there will be a Colorware." He would not release information on new products being developed, but he did hint at new pricing structures for *CoCo Max III* and *Max-10* soon to be released, as well as a rumored release of his products with no copy protection schemes at all.

"I use *CoCo Max* and *Max-10* myself. In fact, the next advertisements in RAINBOW will be done completely using *Max*," said Monin.

He went on to say that he had received calls from a number of clients who are using *The Works* to run their businesses — doing ad and layout work, fliers and newsletters. ☐

Desktop Publisher Comparison	Mouse- or joystick-driven	Special hardware required	Copy-protection	No. of fonts included with base package	No. of clip art figures included with base package	No. of fill patterns with base package	No. of borders with base package	No. of attributes that can be changed	Support for RGB and composite video	Runs on 128K	512K support	Support for Tandy, IBM/Epson/Star/Gemini printers	Support for color printer in color	Colored display	WYSIWYG display	Support for laser printers	Support for both HSCREEN and PMODE4 files	Import/export file capability	Support for multiple columns	Text wrap around graphics	Graphics resizing	Ability to change text attributes	Spelling checker	OS-9 Supported
The Works	y	y	y	13	0	64[1]	NA	5	y	y	y	y	n[2]	y	y	n	y	y	y	y	y	y	y	n
Newspaper Plus	n	n	n	22	50	10	NA	0	y	y	n	y	n	n[3]	y[4]	y	5[5]	y	y	y	n	n	n	n
Home Publisher	y	n	n	14	37	0	8	4	y	y	y	y	n	y	n[4]	n	n	y[6]	y	y	y[7]	y	n	y

[1] 64 fill patterns at one time, including colors; has fill pattern editor
[2] optional $19.95 driver for Okimate 20, Star Rainbow NX1000, CGP-220
[3] some menus are in color; working screens are in monochrome
[4] limited or partial WYSIWYG; only one document section is displayed at a time
[5] some files are too big and must be truncated or cut into sections
[6] set to read in text files only; graphics importing is possible but not available
[7] three sizes to choose from; no dynamic figure sizing

you, *The Works* will not work for you. Let's take a look at why.

Newspaper Plus!

If you want to produce a newsletter for your Boy or Girl Scouts, packed with information and including a subtle graphics punch, then the structured environment of *Newspaper Plus* fits the bill.

The program comes with 22 fonts and 50 clip art pictures. There is a graphics disk you can purchasefor $19.95 with 10 new fill patterns, three new font sets and 50 new graphics picture files.

Newspaper Plus is operated solely from the keyboard, no mouse or joystick interface is required. A conversion utility allows changing graphics and font formats into the *Newspaper Plus* format, but there are size limitations on the imported graphics image. Larger images must be cut into sections or only a part of them may be captured and used. One nice feature is a utility called *Grabber*, which serves to grab graphics images off a screen to be stored for later use in a document.

Newspaper Plus is written mostly in BASIC and gets it speed from machine language subroutines. *Newspaper Plus* also utilizes a structured environment, differing from *The Works*, but similar to Tandy's *Home Publisher* and with more options. To use it, you must choose a layout from a menu, which gets loaded into memory. A typical layout might be two columns broken into four sections each, with a full-page banner across the top, such as the newsletter shown on Page 59. There is no free-form environment; the document is built one section at a time and then compiled for saving, viewing and printing. Of course this has some interesting mix and match capabilities since you always select which panels the newsletter or document will be built from.

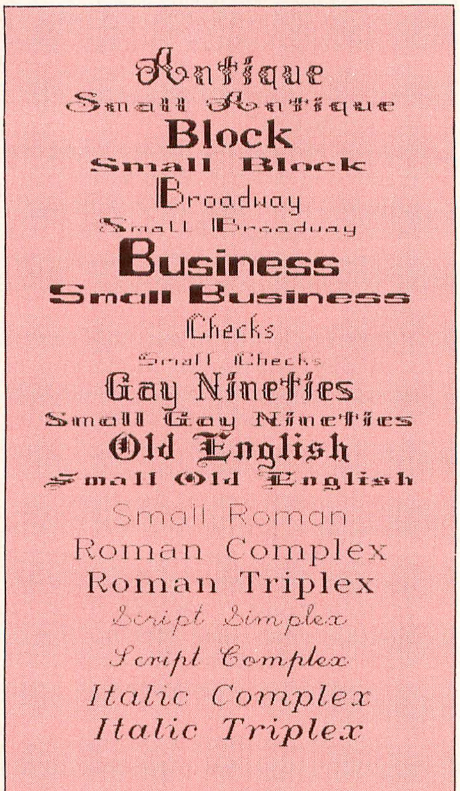


Figure 1: A few samples of the many fonts available for both the *OS-9* and *CoCo Calligrapher*.

I had one major problem with *Newspaper Plus*. When it hits a disk error on a save, it crashes. So if you just spent an hour designing the perfect section of your newsletter, and there is a disk error, you are unable to exit to the Type Up II program to save the memory buffer to restart the program. (I lost my work. I was so upset by this, I tried the program on three different CoCos, three different drive systems, and I had the same problem time after time.) Ed Hathaway of Second City Software is aware of this and has indicated that a patch to fix this problem will be available very soon, and will be sent to all registered *Newspaper Plus* owners.

Newspaper Plus supports a wide assortment of printers, including the Radio Shack printers along with the CGP-220, and unlike any of the other packages we are looking at, the Tandy LP-1000 laser printer. Support for Gemini, Star NX1000 and IBM/Epson compatibles is also included. There is also a utility that allows you to design printer drivers.

It has the best documentation for desktop publishing on the CoCo I have seen. It includes a thorough manual and a beginner's tutorial.

Home Publisher

Tandy 's *Home Publisher* is a modest introduction to desktop publishing for the 128K Color Computer, but works much

The Chief Editor of *Newspaper Plus*

The CoCo Community at large can bear witness to yet another "Local Boy Makes It Big" story — that of 16-year-old Eric Wolf. Eric is sole owner and operator of EAW Software, a company formed to market his innovative software creations.

Eric has been writing software for the Color Computer for several years. His first published program, *Out In Font*, was published in the "Hot CoCo" section of *80 Micro* (now defunct) in 1986. This was a program to generate new type styles and fonts for creative printer output. Could it have been a precursor to *Newspaper Plus*? It may very well have been.

A 10th grade sophomore at Lasalle High School in South Bend, Indiana, Eric stands over 6 feet tall and enjoys basketball and a quiet family life with his parents and three brothers and sisters. Not yet certain where he plans to attend college, Eric wants to pursue a degree in computer software engineering or programming. He has expressed a strong interest in artificial intelligence, which he studies in his spare time, and has taught himself BASIC, machine language and Apple Pascal.

Eric started programming on an old gray CoCo 1 that his Dad brought home when he was 10 years old. From there he became interested in reading THE RAINBOW and keying in programs, eventually trying some programming on his own. When he discovered that he had a talent for it, he set out to write exciting software.

Eric wrote one of the first commercial products for the CoCo 3 when it came out, *CoCo Newsroom* (now the updated *Newpaper Plus)* — he was only 14 years old at the time, incredible as it seems. Originally marketed through Spectrum Projects and Microcom Software, exclusive rights are now owned by Second City Software of Roselle, Illinois. Along with *Newspaper Plus* and the accompanying graphics disk, also written by Eric, Second City sells other popular CoCo software. Just released is another *Newspaper Plus* companion, *NewsArt A-Z*, which is scheduled for release at RAINBOWfest Chicago.

Ed Hathaway, co-owner of Second City Software with David Barnes, an OS-9 analyst and programmer, is very proud of Eric and his accomplishments, and very pleased with the *Newspaper Plus* product. He is generously publishing a quarterly newsletter free of charge to registered *Newspaper Plus* owners, which includes sample newsletter layouts, patches, fixes, upgrades and new product announcements.

David is SysOp of the Second City Software BBS, (312) 307-1519, which lends additional support to the company's clients and serves as a local CoCo club BBS. □

better on a 512K Color Computer using a mouse or joystick. Of the three programs, this one runs the best on a monochrome monitor. (*Newspaper Plus* is difficult to read on some screens and *Max-10*, while sufficient, loses something in the translation without color.) Remember, software must be configured before it can be used properly. If you just loaded up a program and it looks strange, check the settings for the monitor, printer, input device, drives, etc.

Tandy Home Publisher operates in the OS-9 level II environment, though you don't need to own it or be familiar with it to operate the program. It has flexible configuration, 14 fonts, 37 graphics images and 64 foreground and background colors to set your RGB or Composite screen to and has all the common word processing features. The fonts are varied in size and style, not as well done as some other packages. The 37 images are well done.

This is the only Color Computer desktop publishing package under OS-9, but is also the only one with no file translation utility. The biggest problem is the speed at which it operates. It is unbearably slow to update, draw screens, draw pages, and so forth, yet it is a good example of desktop publishing. Its interesting user interface enables the user to work with one portion of the document at a time. Like *Newspaper Plus* it has a structured but far more limited range of layout patterns. There is some compatibility and a program like *OS-9 Calligrapher* might come in handy here.

Printer support for *Home Publisher* is limited to several of the Tandy DMP series printers and an Epson RX-compatible printer. In addition, there is a printer driver disk available from Tandy for $19.95, which has the following popular printer drivers: Tandy CGP-220, C. Itoh 8510 AP, Epson MX-80, Okidata 20, Panasonic KX-P1090, and the Star SG-10.

Tandy Home Publisher also works in the *Multi-Vue* environment, which in theory means you can edit several desktop publishing documents at the same time. However, there is a problem of keeping track of where you are on the screen. You may input some text, but it does not show up because you are looking at a different area of the document than where you are putting the text. This program is also set up to import text from any OS-9 word processing program, though it's a good idea to write it on something else and then import it into the *Home Publisher*. Simple lines, however, can be done within the program.

Extra, Extra!

There are many programs for the CoCo 1, 2 and 3 that will do great drawings or make fantastic fonts but, as mentioned already, unless they meet your needs they are not practical.

Nancy Ewart on Desktop Publishing

Meet Nancy Ewart, freelance writer on computer topics and CoCo user extraordinaire. Nancy insists that she is a user, not a programmer, and takes time out from her busy schedule to talk to a reporter from RAINBOW. When asked about CoCo's desktop publishing programs, she confides, "I have used them all, and I have started working on MS-DOS machines, too." She adds, "I'm a novice *Ventura Publisher* user really, and all I use at home is the CoCo."

A relative newcomer to computers at age 58, Nancy started on computers about five years ago when she bought one for her nephew. She found that she became interested in them herself, and now she owns four CoCos. "I'm an OS-9 advocate," she says, "and the main thing I've been seeing is what I would have liked to have seen all along with the CoCo. There ought to be an easier way to run OS-9."

Nancy says she is disappointed that there is not a better desktop publisher for OS-9. "*Home Publisher* is very slow," she said. "There are none of the more usual typefaces. The smallest type isn't small enough, and you have no control of the leading, which is the spaces between the lines." Nevertheless, she insists that she has learned a lot from using *Home Publisher* and that the program has been very important to her. She has taken the experience gained and applied it to her MS-DOS work. "A lot of what I've learned in *Home Publisher*, *Newspaper Plus*, and *The Works* crosses over to *Ventura*, and vice-versa."

When asked what she thought about *Newspaper Plus*, she said she thought it was good, but she missed the mouse. "It's a very good middle-of-the-road package," she commented, then added "*CoCo Max III* and *Max-10* are much easier to use. I wouldn't fool around with anything else." She also added that the combination sets of fonts you use with *Max-10* are like the style sheets in *Ventura Publisher* for the PC.

When asked if she used her CoCos for any business or professional work, she explained that she had done prayer books, yearbooks, and page layouts for national Girl Scout handbooks, adding that she had recently taken art courses to learn more about graphics design.

□

I talked to several desktop publishing users, and found a wide range of needs — newsletters for clubs or organizations; business or professional documents; and for just pure fun, greeting cards, invitations and banners. And for many of these projects, full-fledged desktop publishing programs are not needed. In such cases, supplementary programs provide enough features.

Calligrapher from Sugar Software, for example, is designed to work only with text. The *Calligrapher* programs include: *OS-9 Calligrapher*, *CoCo Calligrapher* and *OS-9 Font Massager*.

CoCo Calligrapher is a powerful font filter, but is limited under our definition of desktop publishing. Running under Disk BASIC, you can type up to 17 lines of text in one-half inch letters in one of three fonts: Gay Nineties, Old English and Cartoon. The editing capabilities are limited, designed primarily to make flyers, invitations, announcements, etc. It is compatible with IBM, Epson, Gemini and Radio Shack dot-matrix printers. *OS-9 Calligrapher* can load multiple files and fonts (See Figure 1.), set margins, change directories, print files to disk or to the printer, view files, wrap text, justify left, right or center, print in columns, etc. — a fairly full-featured word processor.

OS-9 Font Massager is a package that allows you to create new fonts, invert fonts, double the width or height of a font, halve the height or width, and convert fonts between OS-9 and Disk BASIC, to ASCII or binary. And it works on a CoCo.

Of the three packages, the OS-9 programs clearly have more power and flexibility. They include well-written manuals and require only a very basic knowledge of OS-9. Any individual package is short of being a complete desktop publishing program, but provides good typesetting and font generation. There is always the option to use the additional fonts available from Sugar Software or fonts from other programs. The *Calligrapher* programs are outstanding values if you have text-only needs.

Get The Picture?

The Digisector DS69B and *C-See 3.3* software from Micro Works is also more of a sideline to desktop publishing. It has the ability to create computer-readable images using a video camera and special conversion device. To understand how the Digisector works, think of it as taking a picture,then converting it to a series of numbers that the CoCo understands, reading it into the CoCo memory and having the CoCo display what each of those coded numbers stands for, much as a modem works.

Best results come from using a CoCo 3, though the system works with other CoCos. There are 64 levels of gray, and the software changes the amount of gray in different light intensity sections to give an enhanced image.

The Digisector comes in a ROM pack, but requires special software to run. Be sure your Multi-Pak has the required CoCo 3 upgrade, or you may get some strange results. Once you are finished editing your image, you can save the image on disk. Programs like *Magigraph*, *CoCo Max III* or *Graphicom* can then edit the images and bring them into various programs for further editing.

It supports Radio Shack and IBM/Epson-compatible printers. The reviewer recommends a four-head HQ VCR or a high-quality Camcorder for capturing the video images to get crisp, clear resolution. However, any video source, even a TV can be used and still produce good results. (See Figure 2.)

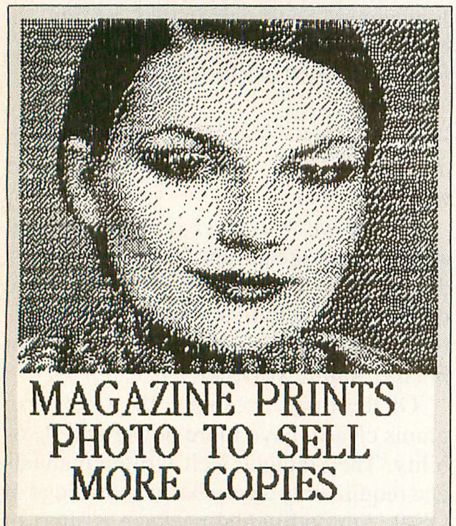


Figure 2: A digitized image captured with Micro Work's Digisector DS69B and *Max-10*.

What makes this program so valuable to desktop publishing is that it can be used to make clip art or graphics images. An image can be imported into a desktop publishing program and integrated into a document. There are enough conversion utility programs available so that once you have the image translated into one of the *C-See* software formats, it can be grabbed and translated into many of the other formats. If what you want is an inexpensive way to handle digitized pictures, the Digisector can't be beat.

Graphics du Jour

The *Art Deli Library* from Specialty Projects is a compendium of `PMODE4` graphics images that you can import into graphics design or desktop publishing packages. It comes in a package with a spiral-bound book containing printouts of each of the 440 graphics images enclosed in the 10-disk package. The images include everything from animals, sports and holidays to seasons, travel and more. A program on the disks called `SHOW` loads each of the images on a disk one after the other. There is no documentation, however. It also has no printer drivers. You can load a screen dump program configured already for your printer to accomplish this task. The more outstanding feature of *Art Deli* is its ability to transfer the images into desktop publishers with file translation utilities or graphics designs packages as clip art. The images are categorized, high quality and professional. (See Figure 3.)

There will be documentation included in the next release of *Art Deli*, along with the availability of a utility disk enabling people to convert the *Art Deli Library* images into other formats for incorporation in desktop publishing documents. The utility disk will sell for $14.95, and will be available soon from Specialty Projects. Specialty Projects has also released *Art Deli II*, which has 220 images on five disks.

You be the Judge

CoCo Graphics Designer Plus is a program that makes banners, cards and signs for 8 1/2-by-11-inch paper. It comes with 16 borders, five fonts and 32 pictures. There are no word processing features and no word wrap, but you can delete your mistakes readily enough. There is a preview screen that gives an overview and allows you to scroll around to specific areas.

It runs on any 64K CoCo or the CoCo 3 and requires a mouse or joystick. It is fast, complete and has additional graphics, font and special border disks available for $14.95. You can convert the fonts and graphics into a variety of formats for other desktop publishing programs. It is limited to two different images per page and only as much text for a card or sign. There are limited styles and capabilities for moving, changing, rearranging and so forth.

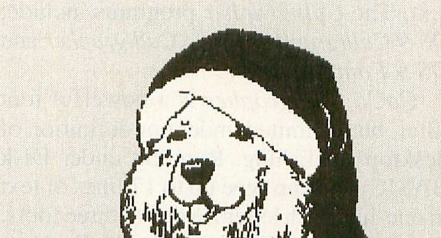

Just ask this happy little fellow what he thinks about Max-10!

Figure 3: *Max-10* screen with *Art Deli* image of a dog.

Logan Ward's Specialty Projects

Everybody seems to know Logan Ward for something. Whether it is for his work at the Computer Center of Memphis, Tennessee, his CoCo Cat and Maxwell Mouse cartoons from RAINBOW, or the "world's only CoCo PC" at RAINBOWfest, everybody gets a chance to bump into Logan Ward sooner or later.

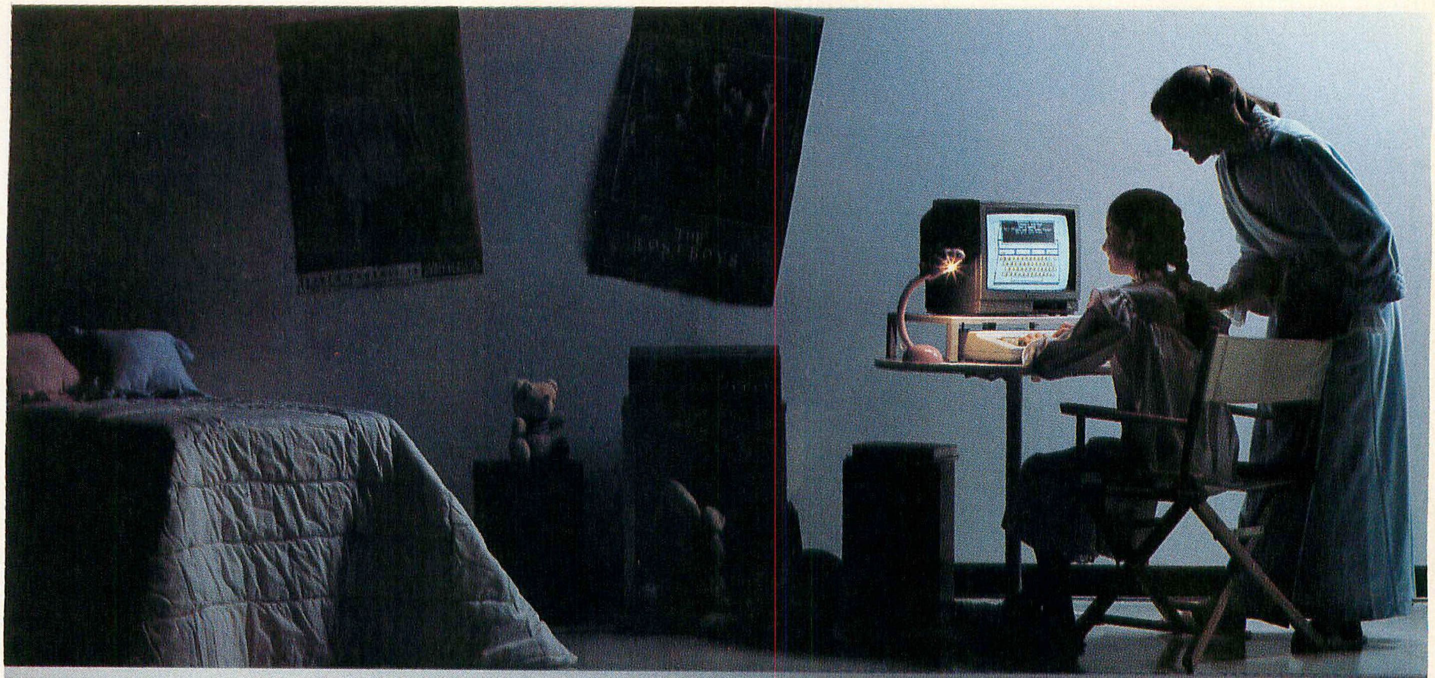
Logan's latest venture is clip art for the CoCo, in the form of a package marketed by Specialty Projects, a company he helped form with a local Color Computer users group. The package is called *Art Deli Library* and is an assortment of 440 clip art images, sorted by theme, on 10 disks for $99.

Logan refuses to take full credit for this release. "This was a real team effort," he says. "It was mostly put together by myself and my wife, Stacy Ward, and B.J. Setton and his wife, Theresa, and also by Bill and Terry Peck. We got together from a local users group, just decided that someone should do some real serious clip art for the CoCo and make it available to the general public."

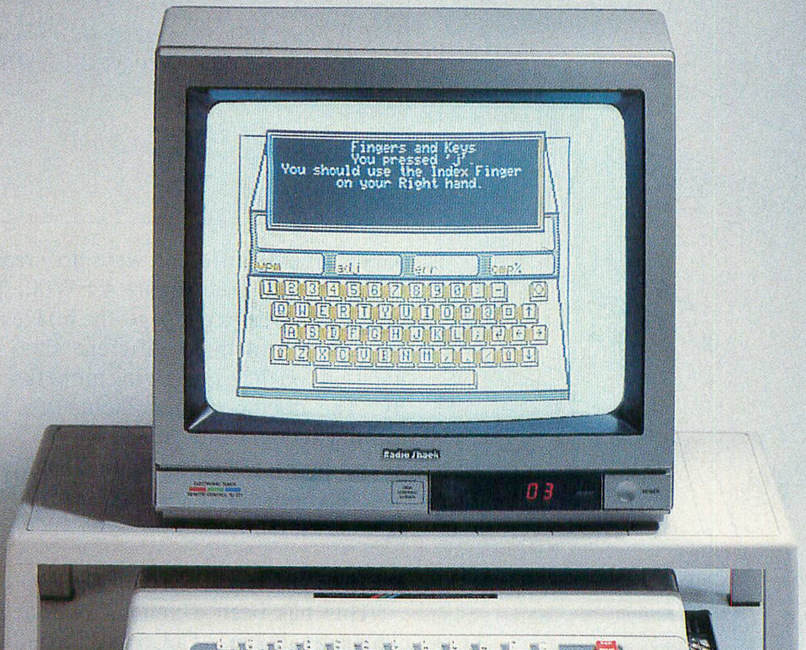
While *Art Deli* has no documentation, it does include a printout of each of the digitized `PMODE4` images. These are arranged by theme on both sides of 10 disks. The themes include holidays, pets, travel, love, sports and silly sports. "All you do is convert them to whatever graphics program you have," says Ward. The images are all professionally rendered high-quality drawings, and do in fact convert readily to the different desktop publishing packages included in this article.

Specialty Projects will soon release a utility disk for transferring the images among different program formats, such as *Newspaper Plus, Home Publisher*, *CoCo Max III* and *Max-10*. The disk will sell for $14.95. Users will also be interested in *Art Deli II* from Specialty Projects, which is 220 images on five disks for $49.95.

It has a good number of printer drivers, and produces excellent documents. One nice extra about *CGDP* is its built-in card formatter to make cards in two different layouts. The program can make a card cover and an inside page, and will print them in such a way that you can fold the



Give your kids a head start with the affordable, expandable Tandy® Color Computer 3®



Why buy a TV game when you can have a powerful computer instead? Just connect the Tandy Color Computer 3 to your TV for an extraordinarily low-priced home computer system.

With the educational software available for the Color Computer 3, your children can study math, reading, typing—a variety of subjects—all while learning how to use a *real* computer.

The Color Computer 3 provides impressive computing power for grownups, too. There's a library of useful software available. Choose from word processing, spreadsheet and database programs, *in addition to* games the whole family can enjoy.

Expand anytime with a printer, disk drives, a telephone modem and more. Add a CM-8 high-resolution monitor to create colorful, razor-sharp graphics.

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FONT DISK A
CoCo Graphics Designer Plus™
User's Manual
ART-DELI LIBRARY
Specialty Projects
The OS9 Calligrapher
The CoCo Calligrapher

"A program for generating fonts, a graphics design program, a set of disks full of clip art, a word processor — all have something in common. . . . if you take these elements and combine them to create integrated text and graphics, you've got desktop publishing."

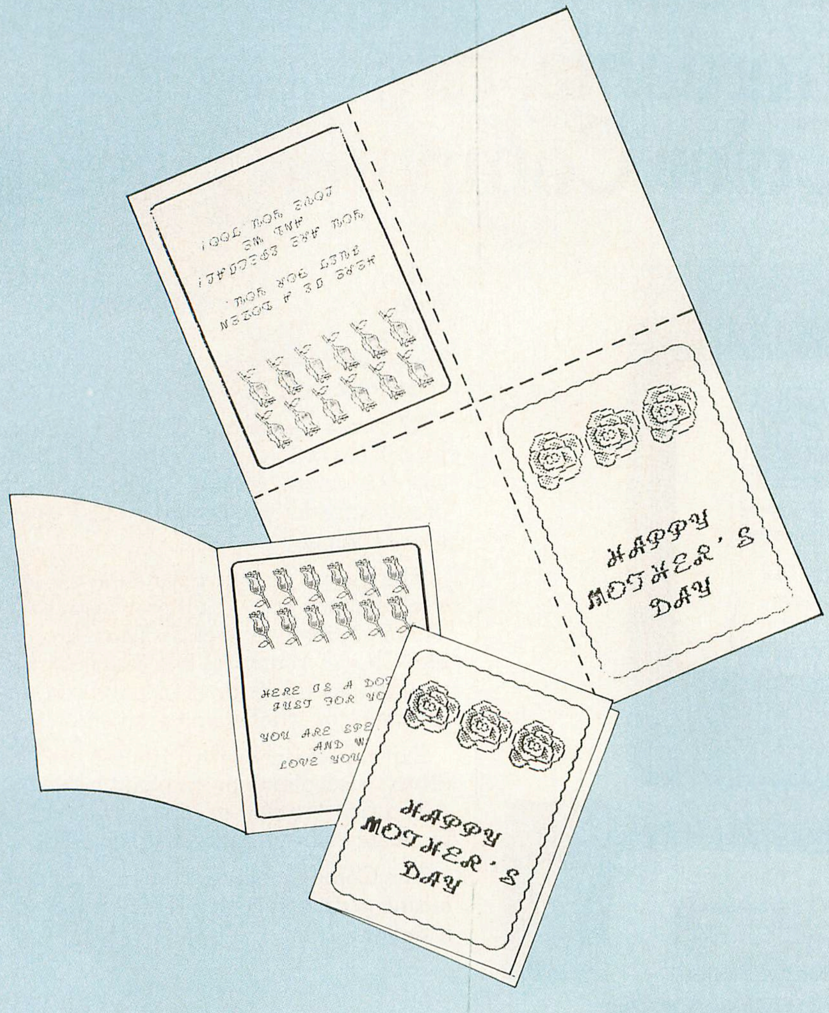
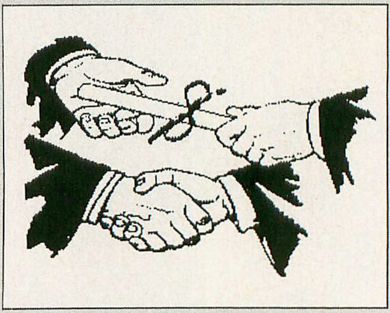

HAPPY MOTHER'S DAY
HERE IS A DOZ
JUST FOR YO
YOU ARE SPE
AND W
LOVE YOU
HAPPY MOTHER'S DAY

Figure 4: *CoCo Graphics Designer Plus* has a built-in greeting card layout and makes designing cards, signs and banners a snap.

Art Deli
from Specialty Projects



What It Does: *Art Deli* consists of 440 pictures on 10 disks. It is a graphics library with no internal programmed capabilities.

Analysis: The images can be converted to the appropriate format and incorporated in a graphics program or desktop publishing document.

Requirements: CoCo 1, 2 or 3 and a disk drive (is compatible with any program that can translate binary, `PMODE 4` or `HSCREEN 2` or `3` files).

CoCoConclusions: *Art Deli* would be a good investment for people who make heavy use of high-quality graphics designs in their desktop publishing programs.

Pricing: $12.95 per disk or $99.95 for a complete 10-disk set.

For more information, see the review of Art-Deli *in the October '87* RAINBOW, *Page 134.*

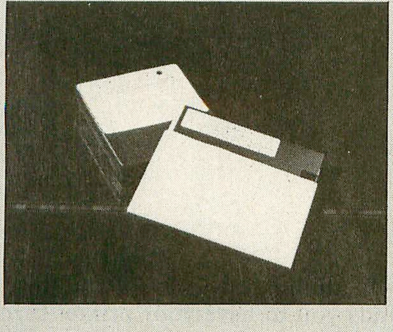
paper several different ways to create a greeting card. (See Figure 4.) While limited to two images per page, the images can be stamped in three different sizes and locations on the page, giving more flexibility. The documentation includes a brief tutorial and is well written.

It supports almost all Radio Shack printers, Panasonic, Star and NX1000 printers, Epson and IBM.

Finding the Right Software

This has been a general overview of what is available in CoCo desktop publishing. It might be pointed out that one thing missing from all but one (*Newspaper Plus*) of the CoCo desktop publishing packages is a driver for a laser printer. Laser printers yield the highest speed, highest resolution and highest quality print overall with the least amount of noise. They are also quite expensive. If, however, your business has a

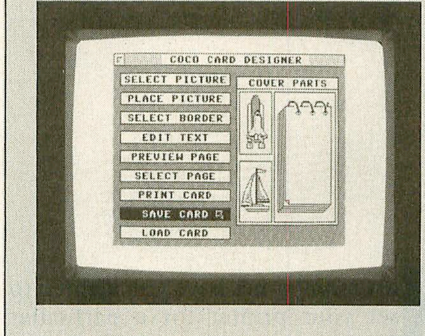
DS69B Digisector With *C-See 3.3* from The Micro Works



What It Does: The DS69B Digisector is a tool on a ROM pack for converting television pictures into a savable, printable format.
Analysis: Pictures captured by the DS69B can be converted into formats that graphics and desktop publishing programs can manipulate. In itself, it is inexpensive, but it requires additional hardware that can be costly.
Requirements: 64K CoCo 1, 2 or 3, one disk drive, a Multi-Pak, video camera or video source.
CoCoConclusions: This is a valuable, full-featured enhancement to a desktop publishing or graphics design software package. If you have the necessary equipment, its low price makes it a very good value.
Pricing: DS69B Digisector including *C-See 3.3*, $149.95.

For more information, see the review of DS69B in this issue of THE RAINBOW, *Page 121.*

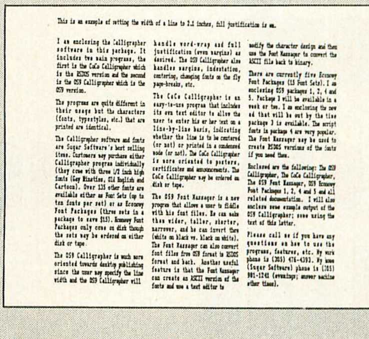
CoCo Graphics Designer Plus from Zebra Systems



What It Does: *CoCo Graphics Designer Plus* is an elegant program designed solely for the creation of signs, cards and banners.
Analysis: Although, it is good at what it does, this program is not truly a desktop publishing program. It is supported by accessory font, picture and border disks, which provide for variety and flexibility.
Requirements: 64K CoCo 1, 2 or 3, one disk drive, and mouse or joystick.
CoCoConclusions: *CoCo Graphics Designer Plus* is a nice, fun, easy-to-use program that does a good job on signs, banners and cards. It has a card formatter built in.
Pricing: *CoCo Graphics Designer Plus*, $29.95; additional font, border and picture disks, $14.95 each.

For more information, see the review of CoCo Graphics Designer Plus *in this issue of* THE RAINBOW, *Page 110.*

CoCo Calligrapher and *OS-9 Calligrapher* from Sugar Software



This is an example of setting the width of a line to 2.1 inches, full justification is on.

I am enclosing the Calligrapher software in this package. It includes two main programs, the first is the CoCo Calligrapher which is the RSDOS version and the second is the OS9 Calligrapher which is the OS9 version.

The programs are quite different in their usage but the characters (fonts, typestyles, etc.) that are printed are identical.

The Calligrapher software and fonts are Sugar Software's best selling items. Customers may purchase either Calligrapher program individually (they come with three 1/2 inch high fonts (Gay Nineties, Old English and Cartoon). Over 135 other fonts are available either as Font Sets (up to ten fonts per set) or as Economy Font Packages (three sets in a package to save $15). Economy Font Packages only come on disk though the sets may be ordered on either disk or tape.

The OS9 Calligrapher is much more oriented towards desktop publishing since the user may specify the line width and the OS9 Calligrapher will handle word-wrap and full justification (even margins) as desired. The OS9 Calligrapher also handles margins, indentation, centering, changing fonts on the fly page-breaks, etc.

The CoCo Calligrapher is an easy-to-use program that includes its own text editor to allow the user to enter his or her text on a line-by-line basis, indicating whether the line is to be centered (or not) or printed in a condensed mode (or not). The CoCo Calligrapher is more oriented to posters, certificates and announcements. The CoCo Calligrapher may be ordered on disk or tape.

The OS9 Font Massager is a new program that allows a user to fiddle with his font files. He can make them wider, taller, shorter, narrower, and he can invert them (white on black vs. black on white). The Font Massager can also convert font files from OS9 format to RSDOS format and back. Another useful feature is that the Font Massager can create an ASCII version of the fonts and use a text editor to modify the character design and then use the Font Massager to convert the ASCII file back to binary.

There are currently five Economy Font Packages (15 Font Sets). I am enclosing OS9 packages 1, 2, 4 and 5. Package 3 will be available in a week or two. I am enclosing the new ad that will be out by the time package 3 is available. The script fonts in package 4 are very popular. The Font Massager may be used to create RSDOS versions of the fonts if you need them.

Enclosed are the following: The OS9 Calligrapher, The CoCo Calligrapher, The OS9 Font Massager, OS9 Economy Font Packages 1, 2, 4 and 5 and all related documentation. I will also enclose some example output of the OS9 Calligrapher; some using the text of this letter.

Please call me if you have any questions on how to use the programs, features, etc. My work phone is (305) 476-4393. My home (Sugar Software) phone is (305) 981-1241 (evenings; answer machine other times).

What It Does: These products work as filters to create text files in many different fonts, sizes and styles, with hundreds of type styles to choose from.
Analysis: Although excellent at what they do, these programs have no inherent way to create graphics or integrate them; they are text-only. It is possible after creating a graphics text file with *OS-9 Calligrapher* to merge a graphics file into a text file, but this would require outside software.
Requirements: *CoCo Calligrapher* requires a 64K RAM CoCo 1, 2 or 3 (cassette or disk). *OS-9 Calligrapher* requires at least one disk drive, 64K and Level I or II OS-9.
CoCoConclusions: These are very powerful tools for producing a wide variety of fonts and typeset documents and is an excellent value.
Pricing: *CoCo Calligrapher* or *OS-9 Calligrapher*, $24.95; Font Sets, $14.95 each; Economy Font Packages with 25 to 30 fonts, $29.95 each; all three Economy Font Packages purchased as a set, $59.95; *OS-9 Font Massager*, $19.95 or $14.95 with *Calligrapher* purchase.
For more information, see the review of CoCo Calligrapher *in the October '85* RAINBOW, *Page 215, and* OS-9 Calligrapher *in the February '86* RAINBOW, *Page 206.*

laser printer, there is a good possibility that it emulates one of the CoCo desktop publishing supported printers. In the description boxes you will find references to review articles that have appeared in RAINBOW for most of these products, a good source for an in-depth look at these products.

What is most important in making your selection is that you make it based on what is right for your needs. Know what it is you want, need and what you are getting before you spend those hard-earned dollars. There are many programs out there for the CoCo 1,2 and 3 that will do great drawings or will make fantastic fonts. But unless they meet *your* needs, they are not what you should be getting. Don't be wooed by what it does do, ask what is missing. What is wrong with this product? What doesn't it do that I need it to do?

A program for generating fonts, a graphics design program, a set of disks full of clip art, a word processor — all have something in common. Can you guess what it is? Right, none of them are desktop publishers. However, if you can take these elements and combine them to create integrated text and graphics, you've got desktop publishing. Armed with some questions and some knowledge as to what you need, you can find a CoCo desktop publishing package that is right for you.

As we evaluate and judge, we must evaluate and judge ourselves. We are all different and unique as people, and we all have different needs. What desktop publishing package works for one, might not work for another. What one can afford to spend, another might not. At THE RAINBOW, we can help with expertise and experience, tell you of problems and possible solutions, and present the products fairly for all to see and judge.

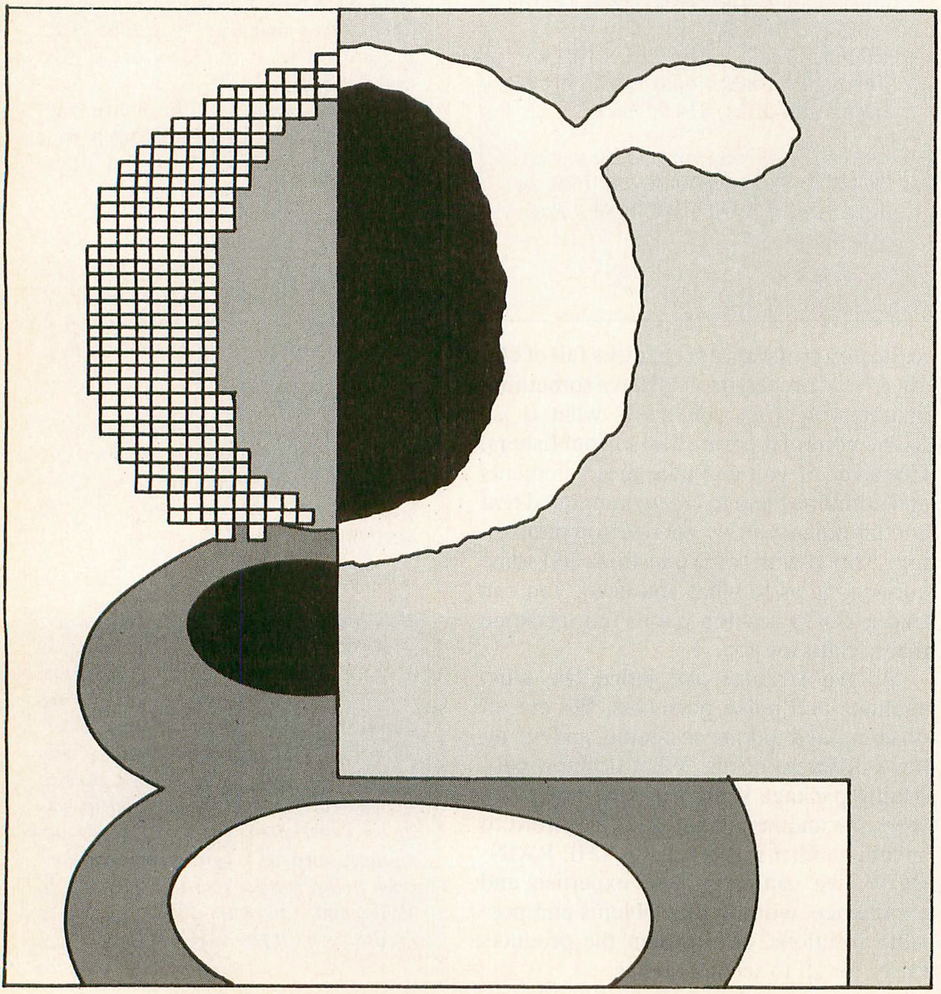
Have you used any of these (or other) desktop publishing programs or packages to create documents (newsletters, invitations, greeting cards, cartoons, banners, signs, etc.) on your CoCo 1, 2 or 3? If so, send us a printout and a disk copy of your work! Be sure to tell us what programs (complete packages, word processors, graphics designers, clip art, font creators, etc.) and printer you used to design it. When space permits, we'll share your creations with the CoCo Community.

Font Selections Made Easy

By Edward Jones

How many times have you wanted to set your printer for a particular font or style, but didn't because you hated to enter all those `CHR$` codes? My program, *Font Setter*, was written to make printer font selection considerably easier. Although it was designed for use with a CoCo 3 and the Tandy DMP-130 printer, it can be modified for the CoCo 2 and other printers.

Edward W. Jones is a retired F.A.A. air traffic control and radar operator who lives in Mobile, Alabama.



On running *Font Setter*, it first reminds you to have your printer turned on, followed by a menu that allows you to select the font or style you want to use. After you have chosen the combination of fonts or styles you want, press R, and you will be asked if you would like to print a test message. If your response is yes, you may enter a message of up to 255 characters.

Next you are asked if you want to change any of the printer settings. If you respond with 'Y', you will be returned to the main menu, where you can change whatever needs changing. If you respond with 'N', the program ends and your printer remains set for the style you selected until it is turned off. I use this program to alter my printer fonts for `LLIST`s and other printing chores. I find the test message section handy for writing short notes in selected fonts.

If you want to use this program with a CoCo 2, change Line 20 so that it contains only the `CLS` statement. Remove Line 220 completely. You can also change all occurrences of `CHR$(216)` to `"*"` in lines 270 through 440, which will then indicate menu selections with a star rather than an ASCII color block. This last change is not necessary for operation on the CoCo 2, but it makes the screen look a little better.

In Line 20, `POKE 150,18` sets the computer to operate with the printer at 2400 baud. If you run your DMP-130 printer at 600 baud, remove this statement.

Font Setter's menu does not allow for all possible printer settings, but includes those I find are used most often. If you have a Tandy printer other than a DMP-130, check your operator's manual and change the `CHR$` codes in lines 520 through 690 accordingly.

(Questions or comments about this program may be directed to the author at 281 Lakeview Drive, Mobile, AL 36609. Please enclose an SASE when writing for a reply.) ☐

The New OWL-Ware Floppy Drive System

No Better System is Available at Any Price (But the Price is Great, too!)

WINDOW WRITER NOW AVALIABLE! (Described in February Rainbow)

DISK CONTROLLER

We at OWL-WARE are pleased to announce that we have purchased the rights to all of the Color Computer Products of J&M Systems. J&M has had more experience with CoCo controllers than any other supplier (except for Radio Shack® itself) and we are proud to add them to our nest! OWL-WARE will now be producing J&M controllers under the OWL brand. These controllers all use J&M's proven designs, with some minor improvements, and they will serve you for years to come.

- All gold contacts
- Works with all CoCo models (1,2,3)
- Holds 2 switchable ROMS
- Positive switching by simple jumper or optional external switch (No erratic software or pokes required)
- Buffered I/O lines to help prevent burn-out if unit accidentally pulled out with the system on
- Latching chips are socketed to speed repairs
- Does not use the WD1773 chip which caused problems with many CoCo 3 systems and is now discontinued
- Attractive all metal case
- Dealer inquiries now invited

CONTROLLER only $69.
(without ROMs)

(Add $14.95 for RSDOS
$19.95 RSDOS and
OWLDOS)

See the next 2 pages for more drive and software specials from OWL-WARE

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OWL CONTROLLER
DISC DRIVE
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DRIVE SYSTEM

Disk drives are not our only business, but they sure are our main business! We have been selling hard and floppy drives for the CoCo longer than any other Rainbow advertiser. **Our double sided drives are brand new, half-heights with a full one year warranty!** The full-height drives offered cheap by our competition are *used or surplus!*

QUICK FLASH!! Announcing the Most Advanced Color Computer 3 Word Processor Ever!

WINDOW WRITER

Window Writer is the first word processor which takes full advantage of OS/9. The result is a word processor which is as modern and professional in action as those previously available only for the IBM and Mac. Allows multi-taking with other programs or itself. Pull down menus and detailed help screens make learning easy and are only a key stroke (or mouse click) away. Can be user configured for everything including menu colors and contents. See the February Rainbow for preview of the early version. **Requires 80 column monitor.**

Available now at a special introductory price of:

$49. until May 15. Normal price $59.

(Ask about combo with spelling checker available for $20)

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In recent months it has become very difficult to obtain dependable, safe power supply and cases for floppy drive systems. They just couldn't pass our quality control. OWL-WARE has now produced a case and power supply that you can be proud to own and use. We believe that this is the best and most attractive drive case available for any computer.

- Built in surge protector! (we believe that this feature is unique in CoCo drive cases)
- Sleek, modern design
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- Stackable case design
- Dealer inquiries now invited

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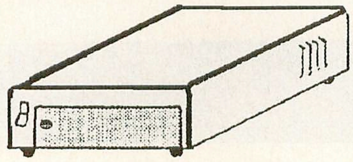
Every hard drive which has been produced by OWL-WARE during the last 3 years is **complete**. A system consists of software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. There are no hidden costs for assembly or testing. When a drive system is ordered, we fully **assemble**, **test**, and **burn-in** the system for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for more than 3 years. This is the longest history in the CoCo market of any system. Some other advertisers are stating that they have one of the most reliable systems for the CoCo *with all of 4 months history in the CoCo hard drive market*! We have reached our position in the hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

Because of many requests for a lower price system in kit form, we are now selling a kit of all parts at a significant discount compared to our regular prices. We recommend this kit (or any kits offered by any other supplier) only to those who have experience in electronic assembly and OS-9.

We have **LR Tech** and **Burke & Burke**

For OS-9 Levels 1 and 2



10 Meg.	20 Meg.	40 Meg.	80 Meg. (2 X 40 Meg.)
System Prices: (Includes Hard Drive, Controller, LR Tech Interface, Software. Fully assembled and tested.)			
$469.	$599.	$725.	$1,069.
Kit Prices: (LR Tech System as above but not assembled or tested.)			
$419.	$549.	$659.	$ 999.
Kit Prices: (As above but using Burke & Burke bus adapter)			
(na)	$489.	$609. (lower prices)	
30 Meg Kit:	$539. (Lowest prices anywhere)		

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 3 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

The table below will summarize some of the key points about our BASIC hard drive system and the B&B system. We believe that we have the best BASIC interface for CoCo hard drives available.

BASIC Hard Drive Systems*

Feature	OWL	B&B
Drive Portion Available at One Time	Entire	Partial (4 sections)
User Sets BASIC/OS-9 Partitions	YES	Yes
Add to Existing OS-9 Drive Without Reformat	YES	No(?)
Drives 0-3 Hard/Floppy	YES	No
Built in Park	YES	No
Speed*	FAST	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but both systems are fast and we sell both. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

Prices: With/Without Hard Drive

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Drive 0 Systems (Half Height, Double Sided, Direct Drives) **$199.** (Same but Single sided) **$185**

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Model $129. 501 or 502

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

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1-215-682-6855

Technical Help

1-215-837-1917

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Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs to copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

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We will select 2 games from our stock. These sold for more than $20 each.

If sold separately this is more than $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95 (or even better) only $6.95 with any Disk Drive Purchase!!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

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170	132	490	200
290	70	650	30
390	82	END	210

The Listing: FONTSETR

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 'DMP-130 PRINTER FONT AND STY
LE SETTER BY EDWARD JONES
20 WIDTH32:POKE150,18:CLS:PALETT
E13,0:PALETTE12,37:PALETTE8,32:P
ALETTE9,48
30 PRINT@160,STRING$(32,243);:PR
INT
40 PRINT" DMP-130 CHARACTER STYL
E SETTER":PRINT"
50 PRINTSTRING$(32,243);
60 FORX=1TO800:NEXT
70 PRINT@481,"TURN ON PRINTER &
PRESS A KEY";
80 A$=INKEY$:IFA$=""THEN80
90 CLS:PRINT" <A> NORMAL TEXT
    <R> QUIT"
100 PRINT" <B> COMPRESSED TEXT";
:PRINT@55,STRING$(8,156)
110 PRINT" <C> CONDENCED TEXT"
120 PRINT" <D> PROPORTIONALLY SP
ACED TEXT
130 PRINT" <E> CORRESPONDENCE NO
RMAL TEXT"
140 PRINT" <F> CORRESPONDENCE CO
MPRESSED"
150 PRINT" <G> START ITALICS----
-<H> STOP"
160 PRINT" <I> START SUBSCRIPT--
-<K> STOP"
170 PRINT" <J> START SUPERSCRIPT
-<K> STOP"
180 PRINT" <L> MICROFONT TEXT"
190 PRINT" <M> START ELONGATE---
-<N> STOP"
200 PRINT" <O> START BOLD-------
-<P> STOP"
210 PRINT" <Q> UNDERLINE--------
-<S> STOP"
220 PALETTE8,0:PALETTE9,48
230 PRINTSTRING$(32,243);
240 PRINT@481,"SELECT LETTERS TO
 SET PRINTER";
250 C$=INKEY$:IFC$=""THEN250
260 IFC$=" "THENCLS:PRINT@161,"P
RINTER FONT AND STYLE IS SET":PR
INT:LINEINPUT"WANT TO PRINT A TE
ST? <Y/N>;:T$
270 IFC$="A"THENPRINT@4,CHR$(216
);:PRINT@292," ";:PRINT@36," ";:
PRINT@68," ";:PRINT@132," ";:PRI
NT@164," ";:GOSUB520:GOTO240
280 IFC$="B"THENPRINT@36,CHR$(21
6);:PRINT@292," ";:PRINT@4," ";:
PRINT@68," ";:PRINT@132," ";:PRI
NT@164," ";:GOSUB530:GOTO240
290 IFC$="C"THENPRINT@68,CHR$(21
6);:PRINT@292," ";:PRINT@4," ";:
PRINT@36," ";:PRINT@132," ";:PRI
NT@164," ";:GOSUB540:GOTO240
300 IFC$="D"THENPRINT@100,CHR$(2
16);:GOSUB550:GOTO240
310 IFC$="E"THENPRINT@132,CHR$(2
16);:PRINT@292," ";:PRINT@4," ";
:PRINT@36," ";:PRINT@68," ";:PRI
NT@164," ";:GOSUB570:GOTO240
320 IFC$="F"THENPRINT@164,CHR$(2
16);:PRINT@292," ";:PRINT@4," ";
:PRINT@36," ";:PRINT@68," ";:PRI
NT@132," ";:GOSUB560:GOTO240
330 IFC$="G"THENPRINT@196,CHR$(2
16);:PRINT@218," ";:GOSUB580:GOT
O240
340 IFC$="H"THENPRINT@218,CHR$(2
16);:PRINT@196," ";:GOSUB590:GOT
O240
350 IFC$="I"THENPRINT@228,CHR$(2
16);:PRINT@260," ";:PRINT@250,"
";:PRINT@282," ";:GOSUB600:GOTO2
40
360 IFC$="J"THENPRINT@260,CHR$(2
16);:PRINT@228," ";:PRINT@250,"
";:PRINT@282," ";:GOSUB610:GOTO2
40
370 IFC$="K"THENPRINT@250,CHR$(2
16);:PRINT@282,CHR$(216);:PRINT@
260," ";:PRINT@228," ";:GOSUB620
:GOTO240
380 IFC$="L"THENPRINT@292,CHR$(2
16);:PRINT@4," ";:PRINT@36," ";:
PRINT@68," ";:PRINT@132," ";:PRI
NT@164," ";:GOSUB630:GOTO240
390 IFC$="M"THENPRINT@324,CHR$(2
16);:PRINT@346," ";:GOSUB640:GOT
O240
400 IFC$="N"THENPRINT@346,CHR$(2
16);:PRINT@324," ";:GOSUB650:GOT
O240
410 IFC$="O"THENPRINT@356,CHR$(2
16);:PRINT@378," ";:GOSUB660:GOT
O240
420 IFC$="P"THENPRINT@378,CHR$(2
16);:PRINT@356," ";:GOSUB670:GOT
O240
430 IFC$="Q"THENPRINT@388,CHR$(2
16);:PRINT@410," ";:GOSUB680:GOT
O240
440 IFC$="S"THENPRINT@410,CHR$(2
16);:PRINT@388," ";:GOSUB690:GOT
O240
445 IFC$<"A"ORC$>"R"THEN240
450 IFC$="R"THENCLS:PRINT@161,"
PRINTER FONT AND STYLE IS SET":F
ORX=1TO800:NEXT:SOUND5,1:PRINT:P
RINT
460 PRINT"   WANT TO PRINT A TES
```

```
T? <Y/N>"
470 T$=INKEY$:IF T$=""THEN470
480 IF T$="N"THEN CLS:END
490 IF T$="Y"THEN700
500 GOTO470
520 PRINT#-2,CHR$(27);CHR$(19);:
RETURN' NORMAL (10 CPI)
530 PRINT#-2,CHR$(27);CHR$(23);:
RETURN' COMPRESSED (12 CPI)
540 PRINT#-2,CHR$(27);CHR$(20);:
RETURN' CONDENCED (17 CPI)
550 PRINT#-2,CHR$(27);CHR$(17);:
RETURN' PROPORTIONALLY SPACED
560 PRINT#-2,CHR$(27);CHR$(29);:
RETURN' CORRESPONDENCE COMPRESSE
D (12 CPI)
570 PRINT#-2,CHR$(27);CHR$(18);:
RETURN' CORRENPONDENCE NORMAL (1
0 CPI)
580 PRINT#-2,CHR$(27);CHR$(66);C
HR$(1);:RETURN' START ITALICS
590 PRINT#-2,CHR$(27);CHR$(66);C
HR$(0);:RETURN' STOP ITALICS
600 PRINT#-2,CHR$(27);CHR$(83);C
HR$(1);:RETURN' START SUBSCRIPT
610 PRINT#-2,CHR$(27);CHR$(83);C
HR$(0);:RETURN' START SUPERSCRIP
T
620 PRINT#-2,CHR$(27);CHR$(88);:
RETURN' STOP SUPER/SUBSCRIPT
630 PRINT#-2,CHR$(27);CHR$(77);:
RETURN' MICROFONT
640 PRINT#-2,CHR$(27);CHR$(14);:
RETURN' START ELONGATE
650 PRINT#-2,CHR$(27);CHR$(15);:
RETURN' STOP ELONGATE
660 PRINT#-2,CHR$(27);CHR$(31);:
RETURN' START BOLD
670 PRINT#-2,CHR$(27);CHR$(32);:
RETURN' STOP BOLD
680 PRINT#-2,CHR$(15);:RETURN'UN
DERLINE
690 PRINT#-2,CHR$(14);:RETURN' S
TOP UNDERLINE
700 CLS:PRINT" ENTER TEST MESSAG
E":PRINTSTRING$(32,243);:PRINT
710 LINEINPUT TM$
720 PRINT#-2,TM$
730 PRINT@481,"PRINT THE MESSAGE
 AGAIN? <Y/N>";
740 R$=INKEY$:IFR$=""THENGOTO740
750 IF R$="Y"THEN720
760 IF R$="N"THEN780
770 GOTO740
780 PRINT@481,"CHANGE THE PRINT
CODES? <Y/N>";
790 PC$=INKEY$:IFPC$=""THEN790
800 IF PC$="Y"THENCLS:GOTO90
810 IF PC$="N"THENCLS:END
820 GOTO790
```

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NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

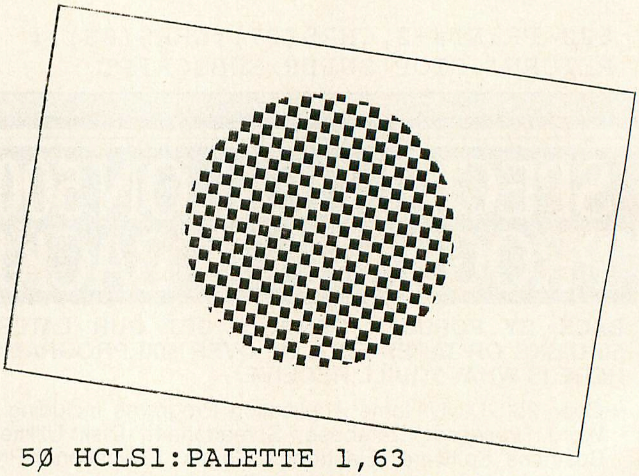
Utilities

Hi-Res Screen Dump

CoCo 3

By Shane Messer

If you're like me, the first thing you think about when you get a printer is graphics. However, the only screen dumps I've seen are for the PMODE graphics, which turn out squashed — and if you try to dump the 320/191 screen, it is about the width of the page but the same height as the PMODE screen. So I figured it out. If you take a 640/191 screen and dump it sideways, it should take up most of the paper. If you have a 320/191 screen and use the HSCREEN 4 command, it switches your screen to 640/191 to dump it. This works fine; however, when using the 640/191 screen, you must use Color 0 for the foreground and Color 1 for the background. Once you type in and run the program, it will draw a small design and print it. It takes a while, so if you have a lot of DRAW statements you can merge them into this program. I used a DMP-132 for this screen dump.



The Listing: DUMP132

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '******************************
*   *     HI-RES SCREEN DUMP
*   *          ROUTINE
*   *            BY
*   *       SHANE MESSER
*   ****************************
*
20 PALETTE 0,0
30 HSCREEN 4
40 POKE 65434,63:POKE &HFF98,128
:POKE &HFF99,61:POKE &HE7BA,201
50 HCLS1:PALETTE 1,63
60 PALETTE 2,63:PALETTE 3,63
70 GOSUB 1000
80 PRINT#-2,CHR$(18)
90 PRINT#-2,CHR$(27);CHR$(16);CH
R$(0);
100 PRINT#-2,CHR$(39);
110 FOR H=0 TO 640 STEP 6
120 PRINT#-2,CHR$(18)
130 PRINT #-2,CHR$(27);CHR$(16);
CHR$(0);
140 PRINT#-2,CHR$(39);
150 FOR Y=198 TO 0 STEP -1
160 D=128
170 IF HPOINT(H,Y)=0 THEN D=D+1
180 IF HPOINT(H+1,Y)=0 THEN D=D+
2
190 IF HPOINT(H+2,Y)=0THEND=D+4
200 IF HPOINT(H+3,Y)=0THEN D=D+8
210 IF HPOINT(H+4,Y)=0THEND=D+16
220 IF HPOINT(H+5,Y)=0THEND=D+32
```

```
230 IF HPOINT(H+6,Y)=0THEND=D+64
240 PRINT #-2,CHR$(D);CHR$(D);
250 NEXT Y:NEXTH
260 END
1000 'SCREEN DRAW ROUTINE
1010 POKE 65497,0:HCOLOR0:FOR T=
100 TO 540 STEP 25:HLINE(T,40)-(
T+10,45),PSET,BF:NEXT
1020 HBUFF 1,900:HGET(100,40)-(5
40,45),1:FOR T=20 TO 185 STEP12:
HPUT(100,T)-(540,T+5),1:HPUT(90,
T+6)-(530,T+12),1:NEXT
1030 HCIRCLE(320,99),150,3
1040 HPAINT(140,90),1,3
1050 HCOLOR0:HLINE(0,0)-(640,198
),PSET,B
1060 POKE 65496,0
10000 RETURN
```

The Timer

4K

By Wayne Hufford

This program is a timekeeper. It can be used for games or any activity that has a time limit. At the first prompt, type in how many minutes you want to count down, followed by the number of seconds. There will be a one-second pause, then the top of the screen shows the amount of time you entered. Note: The time displayed is one second less than the number you typed in because the one-second pause starts the countdown. When the timer gets to zero, a low tone will sound and the program will end.

The Listing: SOUNDOFF

```
0 ' COPYRIGHT 1989  FALSOFT,INC
1 CLS
2 PRINT"HOW MANY MINUTES?"
3 PRINT"HOW MANY SECONDS?"
5 INPUT B
6 INPUT C
7 IF C=0 THEN GOSUB 150
20 FOR M=B TO 0 STEP -1
30 FOR S=C TO 0 STEP -1
40 CLS
50 PRINT M":"S
60 IF S<10 THEN CLS:PRINTM":0"S
65 IF S=0THEN 175
70 FOR T=1 TO 405
80 NEXT T
90 NEXT S
100 NEXT M
120 IF B>0 THEN B=B-1:GOTO20
130 SOUND 1,70:END
150 IF B=0 THEN130ELSE155
155 B=B-1
160 FOR R=1 TO 405:NEXTR:C=59
170 GOTO20
175 IF M=0 THEN 130 ELSE 180
180 M=M-1
185 FOR R=1 TO 405:NEXTR:S=59
190 GOTO40
```

Graphics

Beam3D

16K
ECB

By Joseph Pendell

Beam3D is a short program that allows you to animate three-dimensional pictures. After you type in the program and run it, a small box appears on the screen. Use the right joystick to move it around. Press any key and the box becomes fixed. The right joystick then moves a larger box. Notice that the four corners of the two boxes are connected to give the appearance of three dimensions. Press a key to clear the screen and place the smaller box at a different position. The variables S1 and S2 in Line 10 are the sizes of the two boxes, whereas lines 20 and 30 calculate a multiplying factor. The product of a joystick reading and its factor give a position on the screen. Multiplying factors are chosen so that the boxes do not go off the screen. Lines 90 and 200 check to see if the joystick has been moved since the last time it was read. If it is the same, the graphics are not redrawn. Lines 140 to 160 do the actual drawing of the image. An easy modification to the program is to change the box sizes in Line 10.

The Listing: BEAM3D

```
0 'BEAM3D
1 'BY JOSEPH PENDELL
2 ' COPYRIGHT 1989  FALSOFT,INC
10 S1=10:S2=40
20 M1=(255-S1)/63:M2=(191-S1)/63
30 M3=(255-S2)/63:M4=(191-S2)/63
40 PMODE4,1:PCLS:SCREEN1,1
50 X=JOYSTK(0)*M1
60 Y=JOYSTK(1)*M2
70 LINE(X,Y)-(X+S1,Y+S1),PSET,B
80 IFINKEY$<>""THEN100
90 IF (JOYSTK(0)*M1<>X) OR (JOYS
TK(1)*M2<>Y) THEN PCLS:GOTO50 EL
SE GOTO 80
100 X1=X:Y1=Y
110 LINE(X1,Y1)-(X1+S1,Y1+S1),PS
ET,B
120 X=JOYSTK(0)*M3
130 Y=JOYSTK(1)*M4
140 LINE(X,Y)-(X+S2,Y+S2),PSET,B
```

```
150 LINE(X1,Y1)-(X,Y),PSET
160 LINE(X1+S1,Y1)-(X+S2,Y),PSET
170 LINE(X1,Y1+S1)-(X,Y+S2),PSET
180 LINE(X1+S1,Y1+S1)-(X+S2,Y+S2
),PSET
190 IFINKEY$<>""THENPCLS:GOTO50
200 IF (JOYSTK(0)*M3<>X OR JOYST
K(1)*M4<>Y) THEN PCLS:GOTO110 EL
SE 190
```

Game

Hot Stuff

16K
ECB

By Ric Pucella

This little game will keep you entertained for hours. It's a version of a popular game many played when young, where someone hides an object and others have to find it while the "hider" clues the players by telling them they are either "hot" — if they are close to the object's location — or "cold" — if they are far from it.

In this game the "hider" is the computer and you must find the object in a 30-by-30 square grid. (The size of the grid can be changed by changing the value of `D` in Line 14 of the listing.) To help you remember where you have looked, type `-1,0` at the prompt, and the computer will display all your moves.

The Listing: `HOTCOLD`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 '*** HOT STUFF
6 '*** BY RIC PUCELLA
7 '*** (C) 1988 DEBBIE SOFTWARE
13 CLEAR5000
14 D=30
15 DIMP$(100)
20 FORX=0TO5:READA,A$:A$(X)=CHR$
(A)+" "+A$:NEXTX:CLS:PRINT"HOT S
TUFF":PRINT"BY RIC PUCELLA":PRIN
T"(C) 1988 DEBBIE SOFTWARE":PRIN
T:S=0:X=RND(D):Y=RND(D):FORZ=0TO
1:Z=0:INPUT"X,Y";A,B
22 IF(A>30)OR(B>30)THENNEXTZ ELS
ES=S+1:T=ABS(X-A)+ABS(Y-B):IFT=0
THEN100
25 IFA=-1ANDB=0 THEN S=S-1:FORY1
=0TO5:FORX1=1TOS:IFMID$(P$(X1),9
,1)=LEFT$(A$(Y1),1)THEN PRINTP$(
X1):NEXTX1,Y1,Z :ELSENEXTX1,Y1,Z
30 N=INT(SQR(D))/T+1:IFN>5 THEN
N=5
40 IFT>SQR(D)+2 THEN N=0
50 PRINTA$(N):PRINT
60 P$(S)=RIGHT$("   "+STR$(A),2)
+"  "+RIGHT$("   "+STR$(B),2)+"
 "+A$(N):NEXTZ
100 PRINT"YOU GOT IT IN";S;"MOVE
S..."
110 DATA 175,"YOU'RE FREEZING",2
39,"YOU'RE COLD...",207,"YOU'RE
WARM...",159,"YOU'RE HOT...",255
,"YOU'RE VERY HOT",191,"YOU'RE B
URNING..."
```

Education

Math Drill

4K

By William A. Queen, III

Math Drill quizzes students in addition, subtraction, multiplication and division. The program is menu-driven and keeps track of the number of correct and incorrect answers. You may change the type of problem drilled without losing your score totals.

The Listing: `MATHDRIL`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 REM *** MATH DRILL
20 REM *** <C> 1988, W.A. QUEEN
III
30 CLS:GOSUB 480
40 PRINT @ 226, "YOUR NAME: ";
50 INPUT NAME$
60 CLS:GOSUB 480
70 PRINT @ 169, "A  ADDITION"
80 PRINT @ 201, "S  SUBTRACTION"
90 PRINT @ 233, "M  MULTIPLICATI
ON"
100 PRINT @ 265, "D  DIVISION"
110 PRINT @ 330, "SELECT ONE"
120 AN$ = INKEY$
130 IFAN$="A"THEN150ELSEIFAN$="S
"THEN150ELSEIFAN$="M"THEN150ELSE
IFAN$="D"THEN150
140 GOTO 120
150 CLS:GOSUB 480
160 T = T + 1: X = RND(12): Y =
RND(12)
170 IF AN$ = "A" THEN PRINT @ 22
8, "WHAT IS" X"+"Y;
180 IF AN$ = "S" THEN PRINT @ 22
8, "WHAT IS" X"-"Y;
190 IF AN$ = "M" THEN PRINT @ 22
8, "WHAT IS" X"*"Y;
200 IF AN$ = "D" THEN PRINT @ 22
8, "WHAT IS" X"/"Y;
210 INPUT ANSWER
220 IF AN$ = "A" THEN IF ANSWER
= X+Y THEN 310
230 IF AN$ = "S" THEN IF ANSWER
= X-Y THEN 310
240 IF AN$ = "M" THEN IF ANSWER
= X*Y THEN 310
250 IF AN$ = "D" THEN IF ANSWER
= X/Y THEN 310
260 IF AN$ = "A" THEN PRINT @ 32
6, "THE ANSWER IS" X+Y
270 IF AN$ = "S" THEN PRINT @ 32
6, "THE ANSWER IS" X-Y
280 IF AN$ = "M" THEN PRINT @ 32
6, "THE ANSWER IS" X*Y
290 IF AN$ = "D" THEN PRINT @ 32
6, "THE ANSWER IS" X/Y
300 GOTO 410
310 CLS(3)
320 FOR M = 1 TO 4
330 SOUND 175,1: SOUND 200,1
340 NEXT M
350 CLS
360 PRINT @ 168, "CORRECT, " NAM
E$ "!!!"
370 C=C +1
380 PRINT @ 235, "THAT IS"
390 PRINT @ 258, C "OUT OF" T "C
ORRECT ANSWERS"
400 PRINT @ 298, C/T*100 "% CORR
ECT"
410 PRINT @ 356, "PRESS <ENTER>
WHEN READY"
420 PRINT @ 386, "FOR ANOTHER OR
 <R> TO RETURN"
430 PRINT @ 426, "TO THE MENU";
440 A$ = INKEY$
450 IF A$ = CHR$(13) THEN 150
460 IF A$ = "R" THEN 60
470 GOTO 440
480 PRINT @ 10, "MATH DRILL"
490 PRINT @ 35, "<C> 1988, W.A.
QUEEN III
500 PRINT "====================
===========";
510 RETURN
```

Home Help

$Chores$ for Dollars

16K
ECB

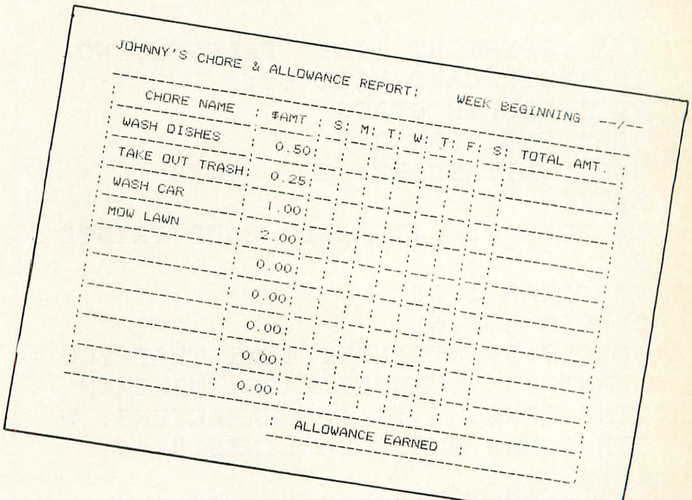
By Steve Paul

$Chores$ for Dollars is a handy program to inspire the younger members of the family to help out with the daily tasks around the home. *$Chores$* is written in two sections. Lines 2 through 8 handle the inputs while lines 10 through 15 print the chore list.

When you run *$Chores$*, the program asks for a list of chores and their respective money amounts, allowing from one to nine entries. When the list is complete, the program automatically goes to the print mode in Line 6. *$Chores$* prints two lists per page and as many pages as you want. Just line up the printer ribbon with the top of the page and start printing. It's amazing how ambitious my son became with this approach to the chore problem.

The Listing: CHORES

```
0 ' COPYRIGHT 1989  FALSOFT,INC
1 '** STEVE PAUL**
  ** BYRON, MI.**
2 CLEAR 400:DIM S1$(9)
3 '***INPUT ITEMS & AMOUNTS***
4 CLS3:PRINT@32*3+1,"ALIGN PAPER
 WITH TOP OF RIBBON";:PRINT@32*4
```



```
JOHNNY'S CHORE & ALLOWANCE REPORT:     WEEK BEGINNING  --/--
-------------------------------------------------------------
:    CHORE NAME    : $AMT : S: M: T: W: T: F: S: TOTAL AMT. :
:------------------:------:--:--:--:--:--:--:--:------------:
: WASH DISHES      :  0.50:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
: TAKE OUT TRASH   :  0.25:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
: WASH CAR         :  1.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
: MOW LAWN         :  2.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
:                  :  0.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
:                  :  0.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
:                  :  0.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
:                  :  0.00:  :  :  :  :  :  :  :            :
:------------------:------:--:--:--:--:--:--:--:------------:
:                  :  0.00:  :  :  :  :  :  :  :            :
-------------------------------------------------------------
                   : ALLOWANCE EARNED :                     :
                   -----------------------------------------
```

```
+8,"TURN PRINTER ON";
5 Y=1:PRINT@32*6+2,"CHILDS FIRST
 NAME: ";:LINEINPUTCFN$:IFLEN(CF
N$)>9THENCLS4:GOSUB17:GOTO5
6 CLS3:PRINT@32*8+2,"CHORE NAME:
 ";:LINEINPUTS1$(Y):IF LEN(S1$(Y
))>14THENCLS4GOSUB17:GOTO6
7 PRINT@32*10+2,"MONEY VALUE";:I
NPUTS(Y):PRINT:IF S1$(Y)= "" THE
N GOTO 11
8 IF Y=9 THEN GOTO11
9 Y=Y+1:GOTO6
```

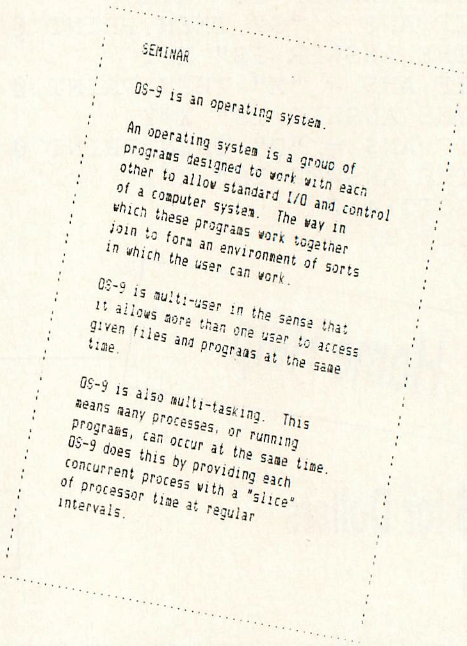
```
10 ' ****PRINTER****
11 CLS6:PRINT@32*8+8, " NOW PRIN
TING ";:FOR LF=1TO5:PRINT#-2
12 NEXTLF: FOR ZZ=1 TO 2:PRINT#-
2,TAB(10);CFN$;"'S CHORE & ALLOW
ANCE REPORT:     WEEK BEGINNING
--/--":PRINT#-2:T$=STRING$(58,"-
"):PRINT#-2,TAB(10)T$:PRINT#-2,T
AB(10)":   CHORE NAME   : $AMT :
S: M: T: W: T: F: S: TOTAL AMT.
:
13 FOR X=1 TO Y-1 STEP 9:FOR Z=X
 TO X+8:PRINT#-2,TAB(10)":------
---------:------:--:--:--:--:--:
--:--:------------:"
14 PRINT#-2,USING "          : %
             %:  #.##:  :  :  :
:  :  :  :             :";S1$(Z);
S(Z):NEXT Z:NEXT X
15 T$=STRING$(57,"-"):PRINT#-2,T
AB(10)T$;":"
16 PRINT#-2,TAB(33)":  ALLOWANCE
 EARNED  :              :":T$=STRI
NG$(34,"-"):PRINT#-2,TAB(33)T$;"
'":PRINT#-2:PRINT#-2:PRINT#-2:NE
XTZZ:PRINT"PRINT AGAIN? (Y/N) ":
INPUT PG$:IF PG$="Y" THEN GOSUB1
8:GOTO11 ELSEEND
17 PRINT@32*8+5," **TO LONG DO O
VER** ";:FORAA=1 TO 1000:NEXT AA
:CLS3:RETURN
18 FOR LF=1TO5:PRINT#-2:NEXTLF:R
ETURN
```

Note Card

16K
ECB

By Darrin Seats

Being a high-school English student, I have found how unenjoyable giving speeches is. Making neatly-written note cards for each speech simply adds to the misery. This program prints a 3-by-5-inch note card by taking the information you type in and dumping it to your printer. When the program is done, cut out the note card along the dotted lines. *Note Card* was written using a DMP-110; if you have a different printer, just change the appropriate code in Line 150.



SEMINAR

OS-9 is an operating system.

An operating system is a group of
programs designed to work with each
other to allow standard I/O and control
of a computer system. The way in
which these programs work together
join to form an environment of sorts
in which the user can work.

OS-9 is multi-user in the sense that
it allows more than one user to access
given files and programs at the same
time.

OS-9 is also multi-tasking. This
means many processes, or running
programs, can occur at the same time.
OS-9 does this by providing each
concurrent process with a "slice"
of processor time at regular
intervals.

The Listing: NOTECARD

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 'NOTE CARD MADE BY:
20 ' DARRIN SEATS
30 ' P.O. BOX 252
40 ' SMITHSHIRE, IL. 61478
50 '
60 POKE 150,41 '1200 BAUD PRINTE
R
70 CLEAR 1200
80 DIM A$(26)
90 CLS:PRINT"INPUT TEXT THAT YOU
 WANT ON YOURNOTE CARD. MAXIMUM
LINE LENGTH  IS 40 CHARACTERS. W
ITH A MAXIMUMOF 26 LINES."
100 A=A+1
110 PRINTA;:LINEINPUT A$(A)
120 IF LEN(A$(A))>40 THEN PRINT"
REDO-TOO LONG!":GOTO 110
130 IF A<26 THEN 100
140 PLAY"A":PRINT"PRINTING NOTE
CARD"
150 PRINT#-2,CHR$(27);CHR$(20) '
CONDENSED
160 GOSUB 190:PRINT#-2:GOSUB 200
:FOR Q=1 TO 26:PRINT#-2,":      "
;:PRINT#-2,A$(Q);:W=LEN(A$(Q)):P
=40-W:FOR E=1 TO P:PRINT#-2," ";
:NEXTE:PRINT#-2,"      :":NEXTQ:G
OSUB 200:GOSUB 190
170 PRINT#-2,CHR$(27);CHR$(19)
180 END
190 FOR Q=1 TO 52:PRINT#-2,".";:
NEXT Q:RETURN
200 PRINT#-2,":";:FOR Q=1 TO 50:
PRINT#-2," ";:NEXTQ:PRINT#-2,":'
:RETURN
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one screen sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

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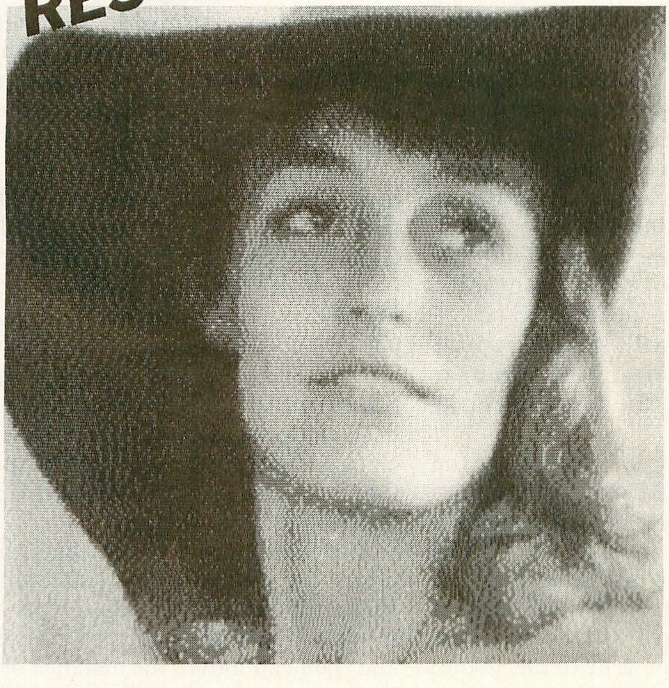

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Heads, sleeves, jackets and index pulses . . .

The ABCs of Disk Drives

By Tony DiStefano
Rainbow Contributing Editor

For many enthusiastic computer users, understanding the mechanics of their hardware is as essential as pen and paper to a writer. The following article will begin a basic explanation of the 40-track disk drive. Articles to follow will elaborate on various other drives.

First, to define a disk drive: A disk is similar to a cassette tape and a drive is like a cassette player. Both systems use the principal of magnetism, and in both cases the media is made of plastic material coated on one or both sides with a substance containing iron oxide. This makes it sensitive to an electromagnet, called a *head.* Both cassette players and disk drives have heads.

In a cassette player the tape is dragged across the head by a motorized mechanism. In the record mode, a magnetic field is created by the record electronics. This field varies in intensity proportional to the signal it is recording. The varying intensity leaves iron particles in the tape aligned in a specific order. Simply stated, the tape is magnetized while in the record mode. Then the tape dragging across the play head makes tiny magnetic fields that are transfered to electrical signals. These are then amplified to an audible level.

A disk drive's electronics works much the same way. The mechanism, obviously, is different in that it is made with a computer in mind. A cassette is made for continuous music, which makes it inconvenient when you want a small piece of data at the end of a tape. A disk drive, though, is made with the ability to access any part of it quickly.

Let's take a closer look at a disk. It is commonly known as a *floppy disk*, because of its flexibility. The disk most used by the CoCo community is 5¼-inch square and consists of four parts.

The first is the actual media. It is a round piece of plastic, a little over 5 inches in diameter, with a 1⅛-inch hole in the center. Better-quality disks have a second piece of plastic glued to the inner side of the disk to reinforce the mechanism that holds and spins the disk. More on that later. It also has a second hole, about 1/16 inch in diameter, that is about a half-inch from the edge of the inside hole. This is called the *index* hole.

The third part of the disk is called the *jacket*. The jacket serves two purposes. First, it is a protective cover for the media. Touching or bending the media can damage it or completely destroy data. Except for one slot, the jacket completely covers the media. This slot has to be left open so that the read/write head can access the media. The jacket also has a hole on both sides to expose the index hole and another hole to expose that part of the media pinched by the mechanism.

The second purpose is to protect the media from being erased. In the upper right-hand corner of the disk is a small notch. When this notch is left uncovered, the disk drive is able to write to the disk whenever the software "tells" it to. When it is covered with opaque tape the disk drive cannot write to the media, even if the software "tells" it to.

The fourth part of a disk is the *sleeve*, a paper envelope that protects the media from fingers or dust and cigarette smoke. Most people don't realize it, but cigarette smoke creates a thin film of tar that attracts dust, putting extra wear on the drive heads. Sleeves cover everything from the index hole to the access hole. Whenever a disk is not being used, it should be stored in its sleeve. Never leave a disk in a drive with the door closed over a long period of time. It puts a dent in the media.

Now let's discuss the drive. It is a mechanism used to read and write data to the disk. The first thing a drive does is spin the disk inside the jacket. When you close the door of a disk drive, a plastic hub pinches the disk to the metal hub and shaft of a motor. Older drives had a capstan and were belt driven by a separate motor. Now drives have the motor built right into the hub. When the drive is selected, the motor spins the disk at about 300 rpm (revolutions per minute), give or take 5 rpm. Older drives took up to five seconds to come up to speed; the newer drives can come up to speed within two revs. That's about two-fifths of a second.

The next responsibility of the drive is to properly move the head. The read/write head is mounted on a movable assembly that can move across the access hole in the disk jacket. The heads rub on the moving media. Open the door of a drive and peek in just after a DIR and you will see the back-and-forth motion. The assembly moves with the help of a stepping motor. The head movement is done in steps, with each step being called a *track*.

With 40 of these tracks on each side of its disk, the 360K drive is today's most commonly used drive. The drive is double-sided, meaning that there are two read/write heads, one for each side of the disk. Tracks are numbered from 0 to 39, Track 0 being on the outermost area of the disk and counting up as tracks move toward the center. The head can move back and forth on a pair of rails controlled by a stepper motor that receives one of two signals from the controlling hardware.

The two signals are "step" and "direction." The direction is set according to where the head is and where you want it to go. Then the step pulse is applied, and the head moves the distance of one track in the specified direction. In the case of the 360K drive, the distance between two tracks is about one-forty-eigth inch. That is 48 tracks per inch.

A hardware switch positioned to turn on when the heads are at Track 0 tells

---

Tony DiStefano is a well-known specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

the controller where the head is. The proper way to position the head to Track 0 is to give the controller a restore command or to step and test for the switch until Track 0 is detected. Some software steps in 40 times without testing; but if the head is not at Track 40, then it bangs against the Track 0 stopper and can possibly become misaligned. A register in the controller keeps track of where the head is. If the controller confuses where the heads are, it restores to Track 0 and then steps to the desired track.

Another duty of the drive is detecting *index* pulse. The little hole in the disk is used to give the controller a reference point. Inside the drive on one side of the hole is an IR (infra-red) LED. On the other side there is an IR detector. When the disk is spinning, most of the time the light emitted by the LED is blocked by the disk. Every revolution of the disk, the hole appears in the path of the LED and detector. This in turn gives a short pulse to the controller. By this signal the controller can determine a reference point to the rotational position of the disk.

This position reference is used when formatting new disks. Formatting divides the disk into small blocks called *sectors*. Each sector has a unique address or ID number. They are assigned by track number, sector number and side. Some controllers, however, do not use side but, instead, have greater sector numbers.

As mentioned earlier, tracks are numbered 0 to 39. In CoCo's case, sectors contain 256 bytes of data each. There are 18 sectors per track per side. Radio Shack DOS is written to handle a single-sided drive with 35 tracks at 18 sectors per track. That gives you a total of 256 bytes x 18 sectors x 35 tracks = 161,280 bytes per disk.

Since most drives today can step 40-tracks and are double-sided. This is a waste of data area. Some third-party DOSs get around this by changing it to handle double-sided and 40 tracks.

When formatting, the controller does one complete track at a time. The index pulse is used to start the writing head up and then to shut it off. This keeps the write head from writing over the part already written on.

So far, I have been talking about the mechanical parts of a disk drive, but there is more — the electronics part.

A disk drive has several electronic sections in it. Though the actual electronics varies, there are standard protocols that make drives made by different companies compatible. This is called the interface. All drives use a 34-pin edge connector to transfer all electronic information to and from the controller. All the pins do basically the same thing. You can virtually unplug a Panasonic 360K drive and plug in a Tandem without any problems.Table 1 shows a pin list of the standard 360K drive connector.

Pin #	Function
2	N/C
4	N/C
6	D4 Select
8	Index Pulse
10	D0 Select
12	D1 Select
14	D2 Select
16	Motor On
18	Direction
20	Step
22	Write Data
24	Write Gate
26	Track 00
28	Write Prot
30	Read Data
32	Side Select
34	N/C

Table 1: Standard Connector for a 360K Drive

All odd pins are ground returns. These signals completely control the drive. The electronics needed for this task are speed regulation for the spinning of the drive, stepping the head in and out, electronics to power the write head and erase head, and amplifiers to read the small signal of the read head and to light the "drive in use" LED.

Now you should have a good idea of how a disk drive works. Next time, I'll discuss how an 80-track drive is different and include a circuit on how to double-step the drives so it can read standard 40-track disks.

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See: Review - December Rainbow.
Dale Puckett - November Rainbow.

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The eleventh in a series of tutorials for the beginner to intermediate machine language programmer

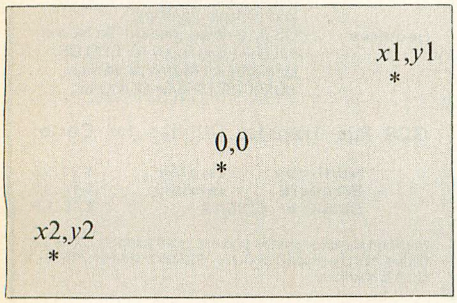
Machine Language Made BASIC

Part XI: 3-D Without Glasses

By William P.Nee

In last month's article about 2-D rotation, everything was plotted symmetrically and we didn't have to pay any attention to location. Now we will be discussing 3-D, and it becomes more important to visualize where we are actually plotting our points.

Think of the center of the screen as 0,0,0 — that is, zero *x*, zero *y*, and zero *z*. Numbers or bits to the right of the center are +*x* and those to the left of the center are -*x*. Numbers or bits above the center are +*y* and below the center are -*y*. Numbers or bits between you and the screen are -*z*, and behind the screen are +*z*. The *z* numbers or bits, of course, are not really there, but they must be taken into consideration when rotating points. We still only `PSET` the *x* and *y* coordinates.



Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

```
ROTATE AROUND X AXIS    ROTATE AROUND Y AXIS    ROTATE AROUND Z
Y1 = Y*COS - Z*SIN      Z1 = Z*COS - X*SIN      X1 = X*COS - Y*SIN
Z1 = Y*SIN + Z*COS      X1 = Z*SIN + X*COS      Y1 = X*SIN + Y*COS
X1 = X                  Y1 = Y                  Z1 = Z
```

Figure 1

Listing 1: ROTATE3D

```
4F00                00100          ORG    $4F00
4F00 108E 5200      00110 START    LDY    #$5200
4F04 10BF 5080      00120          STY    COORD    START OF COORDINATES
4F08 F6   5085      00130          LDB    NUMBER   HOW MANY DOTS TO SET
4F0B F7   5082      00140          STB    COUNT
4F0E C6   32        00150 RNDX     LDB    #50
4F10 BD   BC7C      00160          JSR    $BC7C    REGISTER B TO FP1
4F13 BD   BF1F      00170          JSR    $BF1F    RND(50)
4F16 BD   B3ED      00180          JSR    $B3ED    PUT IT BACK IN REGISTER B
4F19 1E   89        00190          EXG    A,B      MAKE IT A 2-BYTE NUMBER
4F1B ED   A4        00200          STD    ,Y       +X
4F1D ED   26        00210          STD    6,Y      +X
4F1F ED   2C        00220          STD    12,Y     +X
4F21 ED   A8 12     00230          STD    18,Y     +X
4F24 40             00240          NEGA
4F25 ED   A8 18     00250          STD    24,Y     -X
4F28 ED   A8 1E     00260          STD    30,Y     -X
4F2B ED   A8 24     00270          STD    36,Y     -X
4F2E ED   A8 2A     00280          STD    42,Y     -X
4F31 C6   32        00290 RNDY     LDB    #50
4F33 BD   BC7C      00300          JSR    $BC7C    BEGISTER B TO FP1
4F36 BD   BF1F      00310          JSR    $BF1F    RND(50)
4F39 BD   B3ED      00320          JSR    $B3ED    PUT IT BACK IN REGISTER B
4F3C 1E   89        00330          EXG    A,B      MAKE IT A 2-BYTE NUMBER
4F3E ED   22        00340          STD    2,Y      +Y
4F40 ED   28        00350          STD    8,Y      +Y
4F42 ED   A8 1A     00360          STD    26,Y     +Y
4F45 ED   A8 20     00370          STD    32,Y     +Y
4F48 40             00380          NEGA
4F49 ED   2E        00390          STD    14,Y     -Y
4F4B ED   A8 14     00400          STD    20,Y     -Y
4F4E ED   A8 26     00410          STD    38,Y     -Y
4F51 ED   A8 2C     00420          STD    44,Y     -Y
4F54 C6   32        00430 RNDZ     LDB    #50
4F56 BD   BC7C      00440          JSR    $BC7C    BEGISTER B TO FP1
4F59 BD   BF1F      00450          JSR    $BF1F    RND(50)
4F5C BD   B3ED      00460          JSR    $B3ED    PUT IT BACK IN REGISTER B
4F5F 1E   89        00470          EXG    A,B      MAKE IT A 2-BYTE NUMBER
4F61 ED   24        00480          STD    4,Y      +Z
4F63 ED   A8 10     00490          STD    16,Y     +Z
```

```
4F66 ED    A8 1C     00500          STD     28,Y      +Z
4F69 ED    A8 28     00510          STD     40,Y      +Z
4F6C 40              00520          NEGA
4F6D ED    2A        00530          STD     10,Y      -Z
4F6F ED    A8 16     00540          STD     22,Y      -Z
4F72 ED    A8 22     00550          STD     34,Y      -Z
4F75 ED    A8 2E     00560          STD     46,Y      -Z
4F78 31    A8 30     00570          LEAY    48,Y      NEXT COORDINATE LOCATION
4F7B 7A    5082      00580          DEC     COUNT     FINISHED ALL THE DOTS YET?
4F7E 26    8E        00590          BNE     RNDX
4F80 C6    05        00600 PAGE5    LDB     #5
4F82 BD    9653      00610          JSR     $9653
4F85 BD    9542      00620          JSR     $9542     PCLS
4F88 8D    1F        00630          BSR     PICK      WHICH AXIS TO ROTATE AROUND?
4F8A 8D    48        00640          BSR     LOOP5     COMPUTE AND SET POINTS
4F8C C6    01        00650          LDB     #1        GRAPHICS SCREEN
4F8E BD    95AA      00660          JSR     $95AA
4F91 C6    01        00670 PAGE1    LDB     #1
4F93 BD    9653      00680          JSR     $9653
4F96 BD    9542      00690          JSR     $9542     PCLS
4F99 8D    0E        00700          BSR     PICK      WHICH AXIS TO ROTATE AROUND?
4F9B 8D    37        00710          BSR     LOOP5     COMPUTE AND SET POINTS
4F9D C6    01        00720          LDB     #1        GRAPHICS SCREEN
4F9F BD    95AA      00730          JSR     $95AA
4FA2 AD    9F A000   00740 FIN      JSR     [$A000]   ANY INPUT?
4FA6 27    D8        00750          BEQ     PAGE5     IF NOT, BACK TO PAGE5
4FA8 39              00760          RTS               END OF THE PROGRAM
4FA9 C6    03        00770 PICK     LDB     #3        THERE ARE 3 AXIS
4FAB BD    BC7C      00780          JSR     $BC7C     REGISTER B TO FP1
4FAE BD    BF1F      00790          JSR     $BF1F     RND(3)
4FB1 BD    B3ED      00800          JSR     $B3ED     PUT IT BACK IN REGISTER B
4FB4 C1    01        00810          CMPB    #1        IS IT X ROTATION
4FB6 26    08        00820          BNE     YROTAT    BRANCH IF NOT
4FB8 8E    5202      00830          LDX     #$5202    FIRST Y COORDINATE
4FBB 108E  5204      00840          LDY     #$5204    FIRST Z COORDINATE
4FBF 39              00850          RTS
4FC0 C1    02        00860 YROTAT   CMPB    #2        IS IT Y ROTATION
4FC2 26    08        00870          BNE     ZROTAT    BRANCH IF NOT
4FC4 8E    5204      00880          LDX     #$5204    FIRST Z COORDINATE
4FC7 108E  5200      00890          LDY     #$5200    FIRST X COORDINATE
```

Since the Color Computer numbers from the top of the screen down, we change the *y* direction a little. Look at the following diagram:

If you want to set a point (*x1*,*y1*) at coordinates (+12,+16), what is the actual screen location? Since the *x*1 location is to the right of the center, it's location is 128+*x*1; since the *y*1 location is above the center, it's location is 96-*y*1. The screen location is then 140,80. If *x*2 is -20 and *y*2 is -30, *its* screen location is 128+(-20),96-(-30), or 108,126. It is the *x*,*y* (and *z*) coordinates that are stored and rotated, not the screen locations.

In last month's article we actually revolved points around the *z* axis although we just called it rotating. Now we need a formula to rotate around the *x* axis, a horizontal line through the center of the screen, and the *y* axis, a vertical line through the center of the screen. As before, *x*, *y* and *z* are the old locations and *x*1, *y*1 and *z*1 are the new rotated locations. (See Figure 1.)

Since we are using the same angle of rotation in all three cases (see last month's article), all three formulas are the same — just the *x*, *y* and *z* are

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different. Again, it is only the *x* and *y* screen locations that are actually `PSET`.

The machine-language program picks a set of 25 random coordinates between 1 and 50 for *x*, *y* and *z*. Since the pattern is symmetrical, there are actually eight coordinate points computed and rotated:

x,y,z *x,-y,* *-x,y,z* *-x,-y,z*
x,y,-z *x,-y,-z* *-x,y,-z* *-x,-y,-z*

> **"After picking an axis of rotation, the program computes the other two coordinate's rotated position, but the axis coordinate remains unchanged."**

Our coordinate table, which is two bytes for each *x*, *y*, and *z* coordinate, starts at $5200. The first *x* coordinate is stored in locations $5200 +0, +6, +12 and +18; the negative *x* coordinate is stored at $5200 +24, +30, +36 and +42. The first *y* coordinate is stored at $5200 +2, +8, +26 and +32; the negative *y* coordinate is stored at $5200 +14, +20, +38 and +44. The first *z* coordinate is stored at $5200 +4, +16, +28 and +40; the negative *z* coordinate is stored at $5200 +10, +22, +34 and +46.

So starting at $5200 we have: +*x*, 0, +*y*, 0, +*z*, 0, +*x*, 0, +*y*, 0, -*z*, 0, +*x*, 0, -*y*, 0, +*z*, 0, +*x*, 0, -*y*, 0, -*z*, 0, -*x*, 0, +*y*, 0, +*z*, 0, -, 0, +*y*, 0,-*z*, 0, -*x*, 0, -*y*, 0, +*z*, 0, -*x*, 0, -*y*, 0, -*z*, 0. The coordinate table is then increased by 48 to get the start of the next group at $5230. The amount in `NUMBER (FCB 25)` is the number of initial sets of coordinates, and eight times this number is stored and plotted. You can make the amount higher or lower as you want.

Since we run the program from BASIC, we do not need to set the `PMODE` or color. After setting Page 5, the computer randomly selects the axis of rotation. Remember that $5200 is the location of the first *x* coordinate, $5202

```
4FCB 39             00900        RTS
4FCC 8E   5200      00910 ZROTAT LDX    #$5200  FIRST X LOCATION
4FCF 108E 5202      00920        LDY    #$5202  FIRST Y LOCATION
4FD3 39             00930        RTS
4FD4 CE   7000      00940 LOOP5  LDU    #$7000  LOCATION OF "SCRATCH PAD"
4FD7 F6   5085      00950        LDB    NUMBER
4FDA 86   08        00960        LDA    #8      SET 8 POINTS PER COORDINATE
4FDC 3D             00970        MUL
4FDD FD   5083      00980 LOOP3  STD    COUNT1
4FE0 EC   84        00990        LDD    ,X
4FE2 ED   C4        01000        STD    ,U
4FE4 ED   44        01010        STD    4,U
4FE6 47             01020        ASRA
4FE7 56             01030        RORB
4FE8 47             01040        ASRA
4FE9 56             01050        RORB
4FEA 47             01060        ASRA
4FEB 56             01070        RORB
4FEC 47             01080        ASRA
4FED 56             01090        RORB
4FEE 47             01100        ASRA
4FEF 56             01110        RORB
4FF0 47             01120        ASRA
4FF1 56             01130        RORB
4FF2 47             01140        ASRA
4FF3 56             01150        RORB
4FF4 ED   42        01160        STD    2,U
4FF6 EC   C4        01170        LDD    ,U
4FF8 A3   42        01180        SUBD   2,U
4FFA ED   C4        01190        STD    ,U
4FFC EC   A4        01200        LDD    ,Y
4FFE 47             01210        ASRA
4FFF 56             01220        RORB
5000 47             01230        ASRA
5001 56             01240        RORB
5002 47             01250        ASRA
5003 56             01260        RORB
5004 ED   42        01270        STD    2,U
5006 EC   C4        01280        LDD    ,U
5008 A3   42        01290        SUBD   2,U
500A ED   84        01300        STD    ,X
500C EC   A4        01310 NEWY   LDD    ,Y
500E ED   46        01320        STD    6,U
5010 ED   48        01330        STD    8,U
5012 EC   44        01340        LDD    4,U
5014 47             01350        ASRA
5015 56             01360        RORB
5016 47             01370        ASRA
5017 56             01380        RORB
5018 47             01390        ASRA
5019 56             01400        RORB
501A ED   44        01410        STD    4,U
501C EC   48        01420        LDD    8,U
501E 47             01430        ASRA
501F 56             01440        RORB
5020 47             01450        ASRA
5021 56             01460        RORB
5022 47             01470        ASRA
5023 56             01480        RORB
5024 47             01490        ASRA
5025 56             01500        RORB
5026 47             01510        ASRA
5027 56             01520        RORB
5028 47             01530        ASRA
5029 56             01540        RORB
502A 47             01550        ASRA
502B 56             01560        RORB
502C ED   48        01570        STD    8,U
502E EC   46        01580        LDD    6,U
5030 A3   48        01590        SUBD   8,U
5032 E3   44        01600        ADDD   4,U
5034 ED   A4        01610        STD    ,Y
5036 30   06        01620        LEAX   6,X
5038 31   26        01630        LEAY   6,Y
503A FC   5083      01640        LDD    COUNT1
503D 83   0001      01650        SUBD   #1
5040 1026 FF99      01660        LBNE   LOOP3
5044 CE   5200      01670 GET    LDU    #$5200
5047 F6   5085      01680        LDB    NUMBER
504A 86   08        01690        LDA    #8      SET 8 POINTS PER COORDINATE
504C 3D             01700        MUL
504D FD   5083      01710 LOOP6  STD    COUNT1
5050 86   60        01720        LDA    #96
5052 A0   42        01730        SUBA   2,U     GET ACTUAL Y COORDINATE
5054 C6   20        01740        LDB    #32     BYTES PER LINE
```

```
5056 3D         01750          MUL
5057 9B    BA   01760          ADDA   $BA     GRAPHICS START
5059 1F    01   01770          TFR    D,X     REGISTER D TO REGISTER X
505B E6    C4   01780          LDB    ,U      ROTATED X COORDINATE
505D CB    80   01790          ADDB   #128    ACTUAL X COORDINATE ON SCREEN
505F 54         01800          LSRB           8 BITS PER BYTE
5060 54         01810          LSRB
5061 54         01820          LSRB
5062 3A         01830          ABX            ADD TO REGISTER X; = BYTE
5063 86    80   01840 BIT      LDA    #128
5065 AB    C4   01850          ADDA   ,U      GET ACTUAL X COORDINATE
5067 84    07   01860          ANDA   #7      CONVERT TO A NUMBER 0 - 7
5069 108E 92DD  01870          LDY    #$92DD  OR TABLE LOCATION IN ROM
506D E6    84   01880          LDB    ,X      GET CURRENT BYTE CONTENTS
506F EA    A6   01890          ORB    A,Y     OR IT WITH OR TABLE
5071 E7    84   01900          STB    ,X      PSET NEW BYTE CONTENTS
5073 33    46   01910          LEAU   6,U     NEXT COORDINATE LOCATION
5075 FC    5083 01920 FINISH   LDD    COUNT1
5078 83    0001 01930          SUBD   #1
507B 1026 FFCE  01940          LBNE   LOOP6   ALL DONE YET?
507F 39         01950          RTS
5080            01960 COORD    RMB    2
5082            01970 COUNT    RMB    1
5083            01980 COUNT1   RMB    2
5085       19   01990 NUMBER   FCB    25
           4F00 02000          END    START

00000 TOTAL ERRORS
```

is the location of the first *y* coordinate, and $5204 is the location of the first *z* coordinate.

After picking an axis of rotation, the program computes the other two coordinate's rotated position, but the axis coordinate remains unchanged. The end of the program PSETS the *x* and *y* screen locations. Pressing any key stops the program and returns to BASIC.

Instead of using the machine language program to pick the *x*, *y* and *z* coordinates, you can use your own program. The BASIC *Alternate 3-D* program is an example of this. Just remember to poke the following locations with:

```
&H5085 - NUMBER OF DOTS (ND)
&H5200 - START OF COORDINATES
&H4F80 - NEW EXECUTION ADDRESS
```

☐

Listing 2: DRIVER

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 REM DRIVER PROGRAM
10 PCLEAR8:CLEAR200,&H4F00-1
20 X=RND(-TIMER)
30 PMODE 4,1:PCLS:SCREEN 1,1
40 EXEC &H4F00
50 GOTO 50
```

Listing 3: ALTROTAT

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 REM ALTERNATE 3D PROGRAM
10 PCLEAR8:CLEAR200,&H4F80-1
20 X=RND(-TIMER):ND=30:P=&H5200
30 CLS:POKE &H5085,ND:PRINT@200,
"CLEARING -"
40 FOR N=0 TO ND*8:POKE P+N,0:NE
XT:CLS
50 PRINT@200,"COUNTING DOWN -"
60 FOR T=1 TO ND:PRINT@216,ND-T+
1
70 X=60*COS(T):Y=60*SIN(T):Z=60*
TAN(T*ATN(1)/45)
80 X=ABS(X):Y=ABS(Y):Z=ABS(Z)
90 XX=256-X:YY=256-Y:ZZ=256-Z
100 POKE P,X:POKE P+6,X:POKE P+1
2,X:POKE P+18,X
110 POKE P+2,Y:POKE P+8,Y:POKE P
+26,Y:POKE P+32,Y
120 POKE P+4,Z:POKE P+16,Z:POKE
P+28,Z:POKE P+40,Z
130 POKE P+24,XX:POKE P+30,XX:PO
KE P+36,XX:POKE P+42,XX
140 POKE P+14,YY:POKE P+20,YY:PO
KE P+38,YY:POKE P+44,YY
150 POKE P+10,ZZ:POKE P+22,ZZ:PO
KE P+34,ZZ:POKE P+46,ZZ
160 P=P+48:NEXT
170 PMODE 4,1:PCLS:SCREEN 1,1
180 EXEC &H4F80
190 GOTO 190
```

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RAINBOW CERTIFICATION SEAL

A time-saver for Color Computer 3 users . . .

CoCo 3 Printer Spooler

By Marc Genois

Computer users have become accustomed to the timesaving luxuries a computer provides — so much so that many of us are driven mad when we must wait for our printer to finish before continuing to edit or running the program. So I have made a spooler using the 6809's IRQ and a non-used 8K block of the CoCo 3.

The program works on any CoCo 3, 128 or 512K, and at any baud rate. Just type the program BASIC in and save it to a disk. Then run it and type `EXEC &HFC00`. The program asks you for the printer baud rate, after which the program becomes transparent to BASIC.

When you make an `LLIST` with a program under 8K, the screen shows "OK" after two or three seconds and then the cursor reappears while the printer lists the program. Now you can edit or run your program while printing. If your program is longer than 8K — for example, 13K — wait for the first 5K. The cursor reappears and the last 8K is buffered.

To stop printing, type `EXEC`. However, if you have loaded another ML program, type `EXEC &HFD07`. Otherwise you will execute the other ML program.

With my DMP-130 and a serial/parallel interface at 9600 baud, there is no speed difference in the BASIC and the printer going at the same speed as a normal `LLIST`. In fact, I have tested it at all baud rates and at 1200 bps or faster I see no difference. At 600 baud BASIC runs a bit slower, but the keyboard response is good. Occasionally at 300 bps BASIC does not get the key you have pressed.

The program uses none of BASIC memory and is located in a lost space after the new BASIC. A fairly experienced assembly programmer can put it after the RS-DOS (at $D8DO) and burn it on EPROM. But I have not located it after the DOS for compatibility with other DOSs that use this space.

Marc Genois is a French-speaking Canadian who studies Computer Science in Quebec. He also operates a french BBS in Quebec.

(Questions or comments concerning this article may be directed to the author at 319 Roisard, Beauport, Quebec, Canada G1C5K5. Please include an SASE when requesting a reply.) ☐

Editor's Note: In addition to the BASIC *driver, the assembled program* `SPOOLBIN` *is included on this month's* RAINBOW *and* DISK.

Listing 1: `SPOOLBAS`

```
1 CLS:PRINT"COCO 3 PRINTER SPOOL
ER V1.0":PRINT"BY MARC GENOIS (C
)87":PRINT"POKING DATA :"
2 FOR I=&HFC00 TO &HFDA5:READ A:
C=C+A:POKE I,A:PRINT@77,HEX$(I):
NEXT:IF C<>41296 THEN PRINT"CHEC
KSUM ERROR IN DATA LINES.":STOP
3 PRINT:PRINT"NOW, TYPE :":PRINT
"(C)SAVEM'SPOOLER',&HFC00,&HFDA5
,&HFC00":END
4 DATA 52,18,48,141,0,126,189,18
5,156,189
5 DATA 161,177,129,49,37,249,129
,54,34,245
6 DATA 189,163,10,128,49,183,252
,119,72,48
7 DATA 141,0,87,16,174,134,16,15
9,149,190
8 DATA 1,104,191,252,115,48,141,
0,231,191
9 DATA 1,104,134,126,183,1,103,2
6,80,190
10 DATA 1,13,191,252,117,48,141,
1,20,191
11 DATA 1,13,183,1,12,142,64,0,1
91,253
12 DATA 87,191,253,85,142,162,19
3,134,18,167
13 DATA 128,140,162,201,38,249,1
42,162,239,167
14 DATA 128,140,162,249,38,249,1
42,253,7,159
15 DATA 157,28,175,53,146,56,16,
16,32,64
16 DATA 0,190,0,87,0,41,0,18,0,7
17 DATA 0,1,13,13,67,111,67,111,
32,73
18 DATA 73,73,32,80,114,105,110,
116,101,114
19 DATA 32,83,112,111,111,108,10
1,114,32,32
20 DATA 118,49,46,48,13,66,121,3
2,77,97
21 DATA 114,99,32,71,101,110,111
,105,115,32
22 DATA 32,40,99,41,32,49,57,56,
55,13
23 DATA 13,49,61,51,48,48,44,32,
50,61
24 DATA 54,48,48,44,32,51,61,49,
50,48
25 DATA 48,13,52,61,50,52,48,48,
44,32
26 DATA 53,61,52,56,48,48,44,32,
54,61
27 DATA 57,54,48,48,13,69,110,11
6,101,114
28 DATA 32,112,114,105,110,116,1
01,114,32,98
29 DATA 97,117,100,32,114,97,116
,101,32,61
30 DATA 62,32,0,52,16,26,80,142,
64,0
31 DATA 191,253,85,191,253,87,28
,175,53,144
32 DATA 52,4,214,111,92,53,4,43,
4,110
33 DATA 159,252,115,50,98,52,23,
190,253,85
34 DATA 48,1,188,253,87,39,251,2
6,80,246
35 DATA 255,162,52,4,198,55,247,
255,162,48
36 DATA 31,167,128,140,96,0,38,3
,142,64
37 DATA 0,191,253,85,53,4,247,25
5,162,53
38 DATA 151,68,68,0,16,190,253,8
7,188,253
39 DATA 85,39,59,246,255,162,52,
4,198,55
40 DATA 247,255,162,49,141,0,49,
246,252,119
41 DATA 166,165,52,2,166,128,246
,255,34,84
42 DATA 37,23,189,162,191,140,96
,0,38,3
43 DATA 142,64,0,191,253,87,188,
253,85,39
44 DATA 4,106,228,38,225,50,97,5
3,4,247
45 DATA 255,162,110,159,252,117,
1,1,1,2
46 DATA 3,6
```

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Some homegrown animation

BASIC Bird Watching

By Joseph Kolar
Rainbow Contributing Editor

This article employs various attitudes used during the last lesson in which we created the figure of a bird. The following instructions will allow you to run this bird through some simple flight and behavior patterns and will provide you a foundation upon which to create more complex patterns.

The graph-paper utility is not needed since we have developed enough raw material to illustrate additional animation techniques. Refer to Listing 1. Lines 0 to 290 are very similar to last month's program. If you saved it, load it and enter `DEL300-`.

Line 110 is different. It has the second screen, `SCREEN 1`, and `PCLS` because all six attitudes were unveiled for reference. This is the reason Line 290 is masked.

If you did not save the program, simply key in lines 0 to 290 from Listing 1. Enter `181 GOTO 181`, then run the program. You can see the six attitudes; from left to right, the variable names are `A`, `B`, `C`, `D`, `AA` and `BB`.

In assigning variables, try using a sequence that is easy to remember. Here is a list of my attitudes and corresponding variables:

Wing up attitudes	`A&B`
Wings down	`C&D`
Wings partly up	`AA`
Wings partly down	`BB`

With these you can make a tentative flight plan. My strategy for returning to the up-wing position is to use `C`, a variant of `D`, to give a different time-lapse impression. To move the head up, `BB` continues the impression, followed by `AA`, passing the horizontal plane in an upward direction and ending in the full up-wing position using `B`. Use any position or sequence you like. Be creative. You should have no trouble roughing out a variety of possible attitudes on graph paper. Here is a possible configuration:

```
BDM+3,-2M+3,-2M+3,-2M+3,2
```

A straight-line horizontal plane attitude was not created because although the bird travels through the horizontal plane on each flap, a straight line would be too distracting.

Enter `DEL181`, then key in lines 300 and 320 to 430. Attitude `A` is located from `(12,12)` to `(2,4,18)`. Key in Line 320. In the same location, replace `A` with `AA`.

To make this transformation less abrupt, put a pause between the attitudes. Key in Line 310. (We're using a `GOSUB` routine because we will use it several times.) Note `PCLS0`. Add `325 GOTO 325`. Type `EDIT430`, then press ENTER. Press the space bar until the cursor is under P. Enter `6D` to delete `PCLS0`, then run the program. Then type `DEL325`, but don't run the program.

Our next pair of flaps are in lines 340 and 360 so key them in. They move to the right, +6 and down, +6. Enter `345 GOTO 345`, then run the program. Notice that `A` vanished but not `AA`. To correct things enter `EDIT430` and press ENTER. Then press the space bar until the cursor is under R. Type `I` (for Insert) `PCLS0:` and press ENTER.

Key in lines 330 and 440. To make the pause longer in duration, we added a shorter pause. An example is the short pause between flaps at Line 310 and the longer pause while moving to a new location at Line 330. Now run the program.

As soon as the bird location changes, our reference group of attitudes is erased, as well as the bird, `AA`, at the old location. Do you know what erased `A`?

Mask Line 310. You are asked how CoCo erases the lines in this situation. Lines 300 and 320 (with pause and erase masked) erased `A`. `A` and `AA` are in the same location, as were all the `PUTS` in the last tutorial. Each new `PUT` prints a new frame over the previous one, destroying it.

Unmask Line 310. Enter `DEL345` and key in lines 350 and 370, the short and longer pauses.

Key in lines 380 to 410. Note that we move each pair of frames, `C`, `BB` and `AA`, `B`, (+6,+6).

If you want to save the program, enter `CSAVE`. Experiment by substituting your home-grown bird attitudes and by changing locations. This is a good time to take a breather and go over what you've read so far.

To continue, look at Listing 2. If you saved your copy of Listing 1, load it by entering `CLOAD`, then type `DEL420-` and key in lines 420 to 510. Carefully compare lines 300 to 410 and change the `GOTO`s and `GOSUB`s to reflect those in Listing 2. Then run the program.

We are creating different flight patterns, but they aren't logical. Our prime purpose is to continue exploring how to locate various attitudes.

You recall that in lines 300 to 410 the bird was at one location in a pair of attitudes before moving to the next location. His flight downwards is not the same as his return trip. Press BREAK and enter `LIST-480`. The six attitudes return it to its original position. They are, in order, `AA`, `BB`, `C`, `D`, `BB`, `AA`. There is no change in the sequence of pauses: a short pause, a long pause and repeat sequence.

Here is how lines 430 to 480 are actually set up: The chosen attitudes are selected and listed on scratch paper. The coordinates in Line 410 are noted and written down. The first of the six lines is 430, and its variable was added to the coordinates pulled from Line 410. On the work paper copy it looks like this:

```
430 (30,30)-(42,36),AA
```

The coordinates from Line 300 are written about two inches below. The sixth line is designated as Line 480, and its preassigned attitude is `AA`. It looks like this:

```
480 (12,12)-(24,18),AA
```

Line 480 is printed over the attitude in Line 410 to avoid jerky motion in

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

flight. Line 480 should be printed at the same location as Line 300. This blends the movement of frames.

On the work-sheet, between the starting and ending move, write in:

```
440 ( )-( ),BB
450 ( )-( ),C
460 ( )-( ),D
470 ( )-( ),BB
```

All you need now are some coordinates in the four lines. Each line's starting coordinates are the most important. The ending coordinates are predicated on the starting ones, (+12,+6).

I decided to use coordinates (24,24) in lines 440 and 450; (18,18) in lines 460 and 470. These figures are written on the worksheet. It doesn't take a genius to add +12,+6 to each to get the ending locations of each frame.

Even though we are working upwards and to the left, our ending locations are always higher figures than the starting coordinates. Think of it as hanging a canvas in a location of your choice that is set with the beginning coordinates. The actual picture takes up the area that is defined by the ending coordinates.

Fill them in on your work-sheet. You know how to make `PUT` lines. At this point, it is pretty much a copying chore to transfer the data you accumulate into the program to create a flying loop. Line 480 also has the instructions to loop back to Line 300. Modify anything you feel could be improved to create other flight plans.

We use a somewhat different method in Listing 3. Load your copy of Listing 2 and enter `DEL300-`. In Line 110, chop off `Screen 1,1`. We don't want the attitudes created and stored by unmasking Line 290 to remove them from the screen. Key in lines 300 to 460 and run the program.

The bird cycles across the screen a few times, first downward and upwards without seeming to change direction, then undulating as it advances from left to right. (In this tutorial, *x,y* are the horizontal and vertical coordinates respectively.) Line 300 allows CoCo to begin its flight path at a location randomly chosen from 0,60 to 0,120.

Begin a worksheet by listing the scoop on the first line. For example:

```
320 (X,Y)-(X+12,Y+6).
```

Our attitudes will probably change until we get a smooth movement plotted. Expect to make eight frames in a downward direction and about six frames for wavy lines, 14 frames to a cycle.

Add on your paper places for lines 330 to 460:

```
330 (X+, Y+)-(X+, Y+)
      "    "     "    "
      "    "     "    "
460 (X+, Y+)-(X+, Y+)
```

In the first eight lines on your worksheet, you will progress by in-place pairs, creating the starting location, (+6,+6). The ending locations will be increased by (+12,+6). As a result, lines 320 and 330 are the same. The starting locations for Line 330 are *x+0, y+0* or *x,y*.

Add +6,+6 to lines 340 and 350, then enter the info on the worksheet. Continue the same increment pattern for lines 360 and 370 to begin at *(x+12,y+12)*. Guess what the starting coordinates are for lines 380 and 390?

All the ending coordinates are +12, +6 more than the starting coordinates.

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Calculate them and enter them in the appropriate places on the worksheet.

Line 400 is a masked reference line to indicate that the system is changed and we are preparing to move up and to the right. Therefore, cross out Line 400 on your worksheet.

In order to give an uneven aspect to the flight, the attitudes used in lines 410 to 460 are not paired.

Look at lines 410 to 460. The *x* forward motion increases by +6 each time. *y* decreases by -6 except in Line 440.

Line 410 takes a quantum drop at +6,+18. This simulates a sudden drop in an air pocket to add a glitch to the flight track. Note Line 440. It wasn't moved on the vertical coordinate, giving it a more erratic flight. Copy these offsets and then calculate and enter the ending coordinates, based on the beginning coordinates.

Now variables are chosen and assigned to each `PUT` line to make a viable flight.

Gather the info and key in one program line at a time, without the `GOSUB` routines and yanking `PCLS0:` out of Line 500, to see how the pattern shapes up. This is of limited value. You see where the frames progress but the proof is in the pudding — that is, how it looks in flight. Since you are also manipulating locations and time pauses, the interplay of attitude, location and pause has significant visual effects.

After you finalize your choice of attitudes and enter the `PUT`s, add multiple-line `GOSUB` pause routines, etc. Ultimately you must use trial and error to wind up with your desired effect.

A `FOR/NEXT` loop at Line 310 to 470 allows the flight curve to run across the screen four times.

Line 480 gives a hint of the bird as it flies off the screen. Note that `X+259` did not bomb out the program. What value would? Try `X+969`. You can even change the value to `X+65000` and CoCo will still cooperate.

Line 480 is really a nonsense line. The last frame set by Line 460 `PUT`s *x* at 240. *X* equals `(240+247)`. The value in Line 480 equals 487. The only thing that saves it is that *y* is a good value. CoCo sets the *y* and gives up on frame, if you are quick enough. Press BREAK and enter `PRINT X,Y`. Then run the program.

If you use `480 PUT (247,Y)-(259,Y+6), B, PSET`, you get a traffic jam at the right edge. CoCo can't find a place to put the frame because the ending coordinates are off the screen, so it dutifully backs up and tries to get it all on. The result is one big mess.

One of the hazards of using `GET-PUT` is a bunched-up or junk frame. This malfunction is caused by off-the-screen location or `DIM` not allowing storage of the full canvas. But more frequently, improper calculations result in a `PUT` area that is not the same as the `GET` area. This error resides in the ending coordinates.

The coordinates to give the closest full picture without a pile-up are `(243,Y)-(255,Y+16)`. The bird looks like it is flying across the screen but is really flying sideways. Now make a copy of your final program.

The conventional way to show a bit of bird would be to `DRAW` one wing in a 6-by-6 area, enter `DIM` and `GET`, then enter `PUT` at the edge of the screen at 249.

Add to Line 120:

```
,CC(2)
```

```
181 DRAW"BM120,0BD6M+3,-2E2M+1,2"
```

(a wing with a bend.)

```
281 GET (120,0)-(126,6), CC,G
480 PUT(29,Y)-(255,Y+6), CC,
PSET:GOSUB510:GOTO300.
```

Then run the program.

You may use the (*x*,*y*) system to begin at any location as long as you designate the values of *x* and *y* in the program `PUT` line:

```
DEL300-
300 X=50;Y=50
310 PUT (X,Y)-(X+12,Y+6),C,PSET
320 PUT (X-10,Y-10)-(X+2,Y-4),D,
PSET
330 GOTO 330
```

Then run the program.

Line 320 translates to:

`PUT (50-10,50-10)-(50+2,50-4)`
or `PUT (40,40)-(52,46)`

Hope this gives you food for thought and an itch to try your hand at animation. ☐

Listing 1: `FLIGHTS1`

```
0 'LISTING1
100 '
110 PMODE4,1:PCLS:SCREEN1,1
120 DIM A(2), B(2), C(2), D(2),
E(2), AA(2), BB(2)
130 DRAW"BM0,0M+3,2F2M+1,2M+1,-2
E2M+3,-2"
140 DRAW"BM20,0M+2,3F2M+2,1M+2,-
1E2M+2,-3"
150 DRAW"BM40,0BD6M+1,-2E2M+3,-2
M+3,2F2M+1,2"
160 DRAW"BM60,0BD6M+3,-2E2M+1,-2
M+1,2F2M+3,2"
170 DRAW"BM80,0F3M+3,1M+3,-1E3"
180 DRAW"BM100,0BD6M+6,-4M+6,4"
230 GET(0,0)-(12,6),A,G
240 GET (20,0)-(32,6),B,G
250 GET(40,0)-(52,6),C,G
260 GET (60,0)-(72,6),D,G
270 GET(80,0)-(92,6),AA,G
280 GET(100,0)-(112,6),BB,G
290 'PCLS:SCREEN1,1
300 PUT(12,12)-(24,18),A, PSET
310 GOSUB430
320 PUT(12,12)-(24,18),AA,PSET
330 GOSUB440:GOSUB430
340 PUT(18,18)-(30,24),BB,PSET
350 GOSUB430
360 PUT(18,18)-(30,24),D,PSET
370 GOSUB440:GOSUB430
380 PUT(24,24)-(36,30),C,PSET:GO
SUB430
390 PUT(24,24)-(36,30),BB,PSET:G
OSUB440:GOSUB430
400 PUT(30,30)-(42,36),AA,PSET:G
OSUB430
410 PUT(30,30)-(42,36),B,PSET:GO
SUB440:GOSUB430:GOTO420
420 GOTO420
430 FOR Z=1TO100:NEXT:PCLS0:RETU
RN
440 FORZ=1TO50:NEXT:RETURN
```

Listing 2: FLIGHTS2

```
0 'LISTING2
100 '
110 PMODE4,1:PCLS:SCREEN1,1
120 DIM A(2), B(2), C(2), D(2),
E(2), AA(2), BB(2)
130 DRAW"BM0,0M+3,2F2M+1,2M+1,-2
E2M+3,-2"
140 DRAW"BM20,0M+2,3F2M+2,1M+2,-
1E2M+2,-3"
150 DRAW"BM40,0BD6M+1,-2E2M+3,-2
M+3,2F2M+1,2"
160 DRAW"BM60,0BD6M+3,-2E2M+1,-2
M+1,2F2M+3,2"
170 DRAW"BM80,0F3M+3,1M+3,-1E3"
180 DRAW"BM100,0BD6M+6,-4M+6,4"
230 GET(0,0)-(12,6),A,G
240 GET (20,0)-(32,6),B,G
250 GET(40,0)-(52,6),C,G
260 GET (60,0)-(72,6),D,G
270 GET(80,0)-(92,6),AA,G
280 GET(100,0)-(112,6),BB,G
290 'PCLS:SCREEN1,1
300 PUT(12,12)-(24,18),A, PSET
310 GOSUB500
320 PUT(12,12)-(24,18),A,PSET
330 GOSUB510:GOSUB500
340 PUT(18,18)-(30,24),BB,PSET
350 GOSUB500
360 PUT(18,18)-(30,24),D,PSET
370 GOSUB510:GOSUB500
380 PUT(24,24)-(36,30),C,PSET:GO
SUB500
390 PUT(24,24)-(36,30),BB,PSET:G
OSUB510:GOSUB500
400 PUT(30,30)-(42,36),AA,PSET:G
OSUB500
410 PUT(30,30)-(42,36),B,PSET:GO
SUB510:GOSUB500
420 '***************************
430 PUT(30,30)-(42,36),AA,PSET:G
OSUB500
440 PUT(24,24)-(36,30),BB,PSET:G
OSUB510:GOSUB500
450 PUT(24,24)-(36,30),C,PSET:GO
SUB500
460 PUT(18,18)-(30,24),D,PSET:GO
SUB510:GOSUB500
470 PUT(18,18)-(30,24),BB,PSET:G
OSUB500
480 PUT(12,12)-(24,18),AA,PSET:G
OSUB510:GOSUB500:GOTO300
490 GOTO490
500 FOR Z=1TO100:NEXT:PCLS0:RETU
RN
510 FORZ=1TO50:NEXT:RETURN
```

Listing 3: FLIGHTS3

```
0 'LISTING3
100 '
110 PMODE4,1:PCLS
120 DIM A(2), B(2), C(2), D(2),
E(2), AA(2), BB(2)
130 DRAW"BM0,0M+3,2F2M+1,2M+1,-2
E2M+3,-2"
140 DRAW"BM20,0M+2,3F2M+2,1M+2,-
1E2M+2,-3"
150 DRAW"BM40,0BD6M+1,-2E2M+3,-2
M+3,2F2M+1,2"
160 DRAW"BM60,0BD6M+3,-2E2M+1,-2
M+1,2F2M+3,2"
170 DRAW"BM80,0F3M+3,1M+3,-1E3"
180 DRAW"BM100,0BD6M+6,-4M+6,4"
230 GET(0,0)-(12,6),A,G
240 GET (20,0)-(32,6),B,G
250 GET(40,0)-(52,6),C,G
260 GET (60,0)-(72,6),D,G
270 GET(80,0)-(92,6),AA,G
280 GET(100,0)-(112,6),BB,G
290 PCLS:SCREEN1,1
300 Y=RND(60)+60
310 FOR X=0 TO 240 STEP62
320 PUT(X,Y)-(X+12,Y+6),A,PSET:G
OSUB500
330 PUT(X,Y)-(X+12,Y+6),AA,PSET:
GOSUB510:GOSUB500
340 PUT(X+6,Y+6)-(X+18,Y+12),BB,
PSET:GOSUB500
350 PUT(X+6,Y+6)-(X+18,Y+12),D,P
SET:GOSUB510:GOSUB500
360 PUT(X+12,Y+12)-(X+24,Y+18),C
,PSET:GOSUB500
370 PUT(X+12,Y+12)-(X+24,Y+18),B
B,PSET:GOSUB510:GOSUB500
380 PUT(X+18,Y+18)-(X+30,Y+24),A
A,PSET:GOSUB500
390 PUT(X+18,Y+18)-(X+30,Y+24),B
,PSET:GOSUB510:GOSUB500
400 '***************************
410 PUT(X+24,Y+30)-(X+36,Y+36),A
A,PSET:GOSUB500
420 PUT(X+30,Y+24)-(X+42,Y+30),B
,PSET:GOSUB510:GOSUB500
430 PUT(X+36,Y+18)-(X+48,Y+24),A
A,PSET:GOSUB500
440 PUT(X+42,Y+18)-(X+54,Y+24),C
,PSET:GOSUB510:GOSUB500
450 PUT(X+48,Y+12)-(X+60,Y+18),B
B,PSET:GOSUB500
460 PUT(X+54,Y+6)-(X+66,Y+12),BB
,PSET:GOSUB500
470 NEXTX
480 PUT(X+247,Y)-(X+255,Y+6),B,P
SET:GOSUB510:GOTO300
490 GOTO490
500 FOR Z=1TO60:NEXT:PCLS0:RETUR
N
510 FORZ=1TO50:NEXT:RETURN
```

Learning the order, name and climate of each month

Twelve Months of Fun

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Let me tell you, it's no easy task coming up with a new program every month of the year. Strangely enough, inspiration always finds its way to my door. While agonizing over what to write this month, someone suggested a program about the twelve months of the year.

Lo and behold, *Calendar* was born. Now there's an early childhood program to help students learn the order, names and climates of each month. So you see, "twelve months" solved the problem for one.

Since first introducing the programs *Opposites* and *Count on Me*, I have received very positive responses to early-childhood educational programs for the CoCo. When many families buy a Color Computer, "having it help the kids" is a good justification for the money spent. But it is often hard to fulfill due to the lack of good youngster-oriented software. *Calendar* is one step in the right direction.

This program is designed to use the same basic format as introduced in *Opposites* and *Count on Me*, with a graphics representation for each month. This is a good starting point — familiarizing the child with the order of the months and an illustration to associate with each one. (For example, a snowman for January, a Valentine for February, etc. . . .)

Next, the program asks questions about each month. By pressing the space bar, the user can advance to the correct response and then press ENTER, allowing the program to continue asking questions. If the response is correct, the screen shows the correct match. If incorrect, the screen flashes and the student is given a chance to try again. A scorecard may be seen by pressing the @ key. Pressing C from the scorecard will allow you to continue with the quiz.

The written quiz section asks questions like, "Which month comes between January and March?" This helps train and quiz students on the order of the months. The information, though quite basic, is essential to all young children and this is a new and fun way of learning it. In addition, it works to familiarize the child with the computer, laying a good foundation for using more advanced programs as the child gets older.

The graphics are drawn in bold black and white since many beginners use a black and white television with their first CoCo. Be careful when typing in the listing, which can be very long because of the graphic strings involved. (In the past I have shown you ways to merge these graphics to *Match Game*, but this program uses more strings to draw the pictures. I need to come up with a few more changes before I can give you alterations for using that program with these pictures.)

I hope all of you have someone in your family or among your friends who can benefit from *Calendar.*

Thanks to the many people who have continued to send old gray CoCos for us to distribute in our special needs classes throughout our school system. I am expecting our local news media to run some coverage on these new computer stations, which were donated from my many kind readers. If I can reprint anything from those articles, or any pictures, I will try to do so.

We do have several donated disk drives with no controllers. If any of you have an old controller that is collecting dust and you would like to donate it, you may contact me in care of Drury Senior High School, S. Church St., North Adams, MA 01247. The same goes for any older graphics Adventures you have solved and for which you have no further use. (Please, no pirated copies. That only hurts those of us who are trying to help create new software for you!)

Until next month, good luck in your CoCo dealings! ☐

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

50	181	500	248
95	59	560	75
165	71	600	135
255	92	670	78
330	116	770	191
395	231	END	120
450	195		

The Listing: CALENDAR

```
1 REM****************************
2 REM*       THE 12 MONTHS      *
3 REM*   COPYRIGHT (C) 1989     *
4 REM*    BY FRED B. SCERBO     *
5 REM*    60 HARDING AVENUE     *
6 REM*  NORTH ADAMS, MA 01247   *
7 REM****************************
10 CLEAR3000
15 CLS0:PRINTSTRING$(32,220);STR
```

```
ING$(32,156);:FORI=1TO192:READA:
PRINTCHR$(A+128);:NEXT
20 PRINTSTRING$(32,195);STRING$(
32,211);
25 PRINT@358," AN INTRODUCTION T
O ";:PRINT@390,"   THE 12 MONTHS
   ";
30 PRINT@422,"  BY FRED B.SCERBO
 ";:PRINT@454," COPYRIGHT (C) 1
989 ";
35 DATA110,108,109,101,108,108,1
09,100,110,,96,109,108,109,100,1
11,,100,110,100,110,108,105,101,
108,108,109,100,110,108,108,109
40 DATA106,,,101,,,101,,106,,,10
1,,,,110,106,,106,,106,,101,101,
,,101,,106,,,101
45 DATA106,,,101,99,99,103,,106,
,,101,99,103,,106,109,,106,,106,
,101,101,99,99,103,,107,99,99,10
3
50 DATA106,,,101,,,101,,106,,,10
1,,100,,106,100,106,106,,106,,10
1,101,,,101,,106,100,98,
55 DATA106,,,101,,,101,,106,,,10
1,,96,,106,,108,106,,106,,101,10
1,,,101,,106,,100,98
60 DATA107,99,103,101,98,,103,97
,107,99,106,103,99,103,97,107,,9
7,107,97,107,99,102,101,98,96,10
3,97,107,,,101
65 X$=INKEY$:IFX$<>CHR$(13)THEN6
5
70 DIM P$(12,3),A$(6),B$(20),C$(
20),A(20),N(20),B(4),C(4),D(4),E
(4),F(4),AO(20)
75 FORI=1TO3:READ C(I),D(I),E(I)
,F(I):NEXT:FORI=1TO6:READA$(I):N
EXT:FORI=1TO12:READP$(I,1),B$(I)
,P$(I,2),C$(I):NEXT
80 FORI=1TO12:P$(I,3)="BR12ND8R4
ND8R4D8BR4U8R6D8NL6BR4U8F8U8BR4R
4ND8R4BR4D8U4R6U4D8":NEXTI
85 COLOR1,0
90 CLS:PRINTSTRING$(32,"=");:PRI
NT@72,"THE 12 MONTHS":PRINT@134,
"A) REVIEW MONTHS":PRINT@198,"B)
 QUIZ GRAPHICS":PRINT@262,"C) QU
IZ WRITTEN"
95 PRINT@324,"<<<SELECT YOUR CHO
ICE>>>"
100 PRINT:PRINTSTRING$(32,"=");:
PRINT@420,"DEDICATED TO THE STUD
ENTS":PRINTTAB(6)"OF CONTE MIDDL
E SCHOOL"
105 X$=INKEY$:X=RND(-TIMER):IFX$
="A"THEN360ELSEIFX$="B"THEN110EL
SEIFX$="C"THEN630ELSE105
110 CLS0:PMODE0,1:PCLS1
115 LINE(0,0)-(254,170),PRESET,B
120 LINE(6,4)-(122,82),PRESET,BF
```

VIP Writer 1.1

RATED "BEST" IN SEPT '88 "RAINBOW"

VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green & white, double clock speed is not supported, Spooler and menus are unavailable because of memory limitations. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! Version 1.1 includes the configuration program and RGB Hard Disk support. Includes VIP Speller 1.1 DISK $69.95
Available through Radio Shack Express Order Cat. #90-141

Writer owners: upgrade to Writer 1.1 for $20 + $3 S/H. Send only original disk and $23 total.

VIP Speller 1.1

INCLUDES 50,000 WORD DICTIONARY

VIP Speller works with ANY ASCII file created by most popular word processors - even Telewriter 64. It automatically checks text files for words to be corrected, marked for special attention or even added to the 50,000 word Dictionary. You can even view the word in context. Words can be added to or deleted from the dictionary or you can create your own dictionary! New features of version 1.1 are FASTER and more reliable disk access and printing at 9600 baud. DISK $34.95

Speller owners: upgrade to Speller 1.1 for $10 + $3 S/H. Send original disk and $13 Total.

VIP Calc 1.1

"MORE USEABLE FEATURES" FEB. 1985 "RAINBOW"

VIP Calc has all the features of VIP Calc III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Calc is the most complete calc for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and improved display speed. DISK $59.95

Calc owners: upgrade to Calc 1.1 for $10 + $3 S/H. Send only original disk and $13 total.

VIP Database 1.1

"ONE OF THE BEST" JUL '84 "RAINBOW"

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Database is the most complete database for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and single spaced reports. DISK $49.95

Database owners: upgrade to Database 1.1 for $10 + $3 S/H. Send only disk and $13 total.

VIP Disk-ZAP 1.1

RAVED ABOUT IN THE APRIL 1983 "RAINBOW"

Now you can retrieve lost data on any disk. VIP Disk-Zap is the ultimate repair utility for repair of most disk errors. VIP Disk-Zap verifies diskettes, reads and writes any sector and lets you retrieve all types of bashed text files, BASIC and ML programs. VIP Disk-Zap includes an informative 50 page tutorial manual. New features of version 1.1 are FASTER and more RELIABLE disk access and printing at up to 9600 BAUD. *DISK $24.95*

Disk-Zap owners: upgrade to Disk-Zap 1.1 for $10 + $3 S/H. Send original disk and $13 Total

VIP Terminal

RATED BEST IN JANUARY 1984 "RAINBOW"

For your important communications needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs and messages and print them! The VIP Terminal features 32, 51, 64 or 85 characters by 21 or 24 lines on the screen and has a 43K byte buffer to store information. DISK $29.95

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Available through Radio Shack Express Order Cat. #90-213.
VIP Library orders add $4 S/H USA, $5 Canada & $10 Foreign

VIP Integrated Library owners: upgrade to the VIP Integrated Library 1.2 for $45 + $3 S/H. Send only ORIGINAL disk and $48 total.

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```
125 LINE(128,4)-(248,82),PRESET,
B
130 LINE(6,86)-(122,164),PRESET,
B
135 LINE(128,86)-(248,164),PRESE
T,B
140 DRAW"BM26,188C0NU10R10NU10BR
6R10U6L10U4R10BR6NR10D4NR10D6R10
BR12BU6NE4D2F4BR6R10U6L10U4R10BR
6ND10R10D4NL10BR6NR10D6U10R10D10
BR6NR10U10R10BR6NR10D4NR10D6R10B
R10U10NL4R10D4NL10D6NL14BR6U10R1
0D4NL10D6BR6U10R10D4L10R4F6BR6E4
U2H4"
145 DATA130,6,246,80,6,86,120,16
2,130,86,246,162
150 PAINT(2,2),0,0:PCOPY1TO3
155 PMODE0,4:PCLS1
160 LINE(0,0)-(254,170),PRESET,B
F
165 LINE(8,6)-(120,80),PSET,BF
170 PCOPY4TO2:PMODE0,1:SCREEN1,1
175 DATA"BM2,8C1","BM130,8C0","B
M2,90C0","BM130,90C0","BM2,48C0"
,"BM130,48C0"
180 FORI=1TO12
185 A(I)=RND(12):IFN(A(I))=1THEN
185
190 N(A(I))=1:NEXTI:FORY=1TO12:C
OLOR1,0
195 FORI=2TO4
200 B(I)=RND(3)+1:IFN(B(I))=0THE
N200
205 N(B(I))=0:NEXTI:FORI=1TO4:N(
I)=1:NEXT
210 B=RND(10):IFB=A((Y))THEN210
215 C=RND(10):IFC=B OR C=A((Y))T
HEN215
220 DRAW A$(1):DRAWP$(A(Y),1)
225 DRAW A$(B(2)):DRAWP$(B,2):DR
AWP$(B,3)
230 DRAW A$(B(3)):DRAWP$(C,2):DR
AWP$(C,3)
235 DRAW A$(B(4)):DRAWP$(A(Y),2)
:DRAWP$(A(Y),3)
240 COLOR1,0
245 Z=0
250 PMODE0,4
255 DRAW A$(1)+"C0":DRAWP$(A(Y),
1)
260 DRAW A$(B(2))+"C1":DRAWP$(B,
2):DRAWP$(B,3)
265 DRAW A$(B(3))+"C1":DRAWP$(C,
2):DRAWP$(C,3)
270 DRAW A$(B(4))+"C1":DRAWP$(A(
Y),2):DRAWP$(A(Y),3)
275 PMODE0,1:SCREEN1,1
280 LINE(8,6)-(120,80),PSET,B
285 X$=INKEY$:IFX$=" "THEN295ELS
EIFX$="@"THEN800
290 COLOR1,0:LINE(8,6)-(120,80),
PRESET,B:GOTO280
295 Z=Z+1:IFZ=4THENZ=1
300 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PSET,B
305 X$=INKEY$:IFX$=" "THEN295ELS
EIFX$=CHR$(13)THEN315ELSEIFX$="@
"THEN800
310 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PRESET,B:GOTO300
315 IFZ+1=B(4)THEN325
320 NW=NW+1:FORK=1TO5:PMODE0,4:S
CREEN1,1:SOUND10,3:PMODE0,1:SCRE
EN1,1:SOUND1,3:NEXTK:GOTO300
325 NC=NC+1:PMODE0,4:PCLS1:LINE(
0,40)-(256,126),PRESET,B:LINE(6,
44)-(124,122),PRESET,B:LINE(130,
44)-(248,122),PRESET,B:PAINT(2,4
2),0,0
330 DRAW A$(5):DRAWP$(A(Y),1)
335 DRAW A$(6):DRAWP$(A(Y),2):DR
AWP$(A(Y),3)
340 SCREEN1,1
345 X$=INKEY$:IFX$<>CHR$(13)THEN
345
350 PMODE0,1
355 PCOPY3TO1:SCREEN1,1:PCOPY2TO
4:NEXTY:GOTO800
360 PMODE0,2:PCLS1:SCREEN1,1:LIN
E(0,40)-(256,126),PRESET,B:LINE(
6,44)-(124,122),PRESET,B:LINE(13
0,44)-(248,122),PRESET,B:PAINT(2
,42),0,0
365 FORI=1TO12:DRAW A$(5):DRAWP$
(I,1)
370 DRAW A$(6):DRAWP$(I,2):DRAWP
$(I,3)
375 X$=INKEY$:IFX$<>CHR$(13)THEN
375
380 COLOR1,0:LINE(8,46)-(122,120
),PSET,BF:LINE(132,46)-(246,120)
,PSET,BF:NEXTI
385 RUN
390 DATA "BR14BD28R12L6D12NL6BR1
0U12R8D6NL8D6BR6U12M+8,+12U12BR6
D12R8U12BR6ND12R8D6NL8D6BR6U12R8
D6L6F6BR12U6NH6E6BE4BU4NL104BD28
L104"
395 DATA JANUARY
400 DATA"BR10BD46R100L58H4U6E4R1
2F4D6NG4BU10BL6E4U4H4L8G4D4F2BU1
0BR2H2U4E2R8F2D4G2BU10NR4NU8L2NU
8L2NU8L2NU8L2NU8L4BD16NG8BR16F8B
D30BL58U8NG2BR6NR6D4R6D4NL6BR8U8
L4R8"
405 DATA DECEMBER AND FEBRUARY
410 DATA "BR14BD28NR8D6NR8D6BR12
NR8U6NR8U6R8BR4R10D6L8U6D12L2R10
NU4BR4U12R8D6L6F6BR4BU12D12R8U12
BR4ND12R8D6NL8D6BR4U12R8D6L6F6BR
10U6NH6E6BE4BU4NL104BD28L104"
415 DATA FEBRUARY
```

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```
420 DATA"BR60BD46M+18,-22U4H2U2H
2L2H2L4G2L2G4ND2H4L2H2L4G2L2G2D2
G2D4M+18,+22FEBH16BR6M-12,+6NH4N
D4L2NH4ND4BM+36,-18BD4M+16,-10NL
6ND4BD44BL74R6D4L6D4R6BR6U8F8U8B
R4R2D8L2R6U8NL4"
425 DATA JANUARY AND MARCH
430 DATA "BR26BD28ND12R6ND12R6D1
2BR6U12R8D6NL8D6BR6U12R8D6L6F6BR
6NR8U12R8BR6D12U6R8U6ND12BR22BU8
NL104BD28L104"
435 DATA MARCH
440 DATA"BR58BD20U8E4R10F8D4G4NL
12F4D4G8L10H4NU8G4L10H8U4E4NR12H
4U4E8R10NF4BD32G6L4BL28BD10R6D4N
L6D4NL6BR6U8R6D4L4F4BR4R2NU8R4U8
NL6"
445 DATA FEBRUARY AND APRIL
450 DATA "BR32BD28ND12R8D6NL8D6B
R6U12R8D6NL6BR6D6U12R8D6L6F6BR8U
12BR8D12R8BR24BU20NL104BD28L104"
455 DATA APRIL
460 DATA"BR58BD28F4R20E4NU4F2R8E
6U10H6L20G8ND6E4H8L16G8E2L10G6L6
G6D8F4R18E8G4R12E6BG10BR4NG12BL8
G14BL8E10BR24NG12E2BR8NG10BR8NG1
2BR8NG10BR8G12BL66BD8D4R6D4U8BR6
R4ND8R4BR4D8U4R6U4ND8"
465 DATA MARCH AND MAY
470 DATA "BR38BD28ND12R8ND12R8ND
12BR6ND12R8D6NL8D6BR12U6NH6E6BR3
0BU8NL104BD28L104"
475 DATA MAY
480 DATA"BR10BD46R100L74U10H14U4
D10F16R2U8E14U4D10G16U20E6U6G2H2
G2H2G2H2D6F6BD22BR42U10H14U4D10F
16R2U8E14U4D10G16U20E6U6G2H2G2H2
G2H2D6F6BD32BL68NR6D4R6D4NL6BR10
U8L4R8BR4D8U4R6D4U8"
485 DATA APRIL AND JUNE
490 DATA "BR32BD28R12L6D12NL6BR1
2NU12R8NU12BR6U12F12U12BR6NR8D6N
R8D6R8BR26BU20NL104BD28L104"
495 DATA JUNE
500 DATA"BR28BD20R64D2L64R6D12NG
2NF2BD4NG2NF2BD4NG2F2BE12R30U2L3
0U2R30U2L30U2R30BD32BL58L6D8U4R6
D4NL6BR10U8L4R8BR4D8U4R6D4U8"
505 DATA MAY AND JULY
510 DATA "BR32BD28R12L6D12NL6BR1
2NU12R8NU12BR8NU12R8BR8U6NH6E6BR
28BU8NL104BD28L104"
515 DATA JULY
520 DATA"BR20BD22D16R50U16NL50D8
R10E2R2E2R2E2U2E2U2BU6NU4BF2BR2N
E4BD2BR4NR4BG2BD2NF4BL12NG2BU4NL
4BE2BU2NH2BD44BL74ND2R6D4G2D2BR1
2U8L4R8BR4D8U4R6D4U8"
525 DATA JUNE AND AUGUST
530 DATA "BR22BD28ND12R8D6NL8D6B
R6NU12R8NU12BR6NR8U12R8BD6NL4D6B
R6NU12R8NU12BR6R8U6L8U6R8BR4R6ND
12R6BR14BU8NL104BD28L104"
535 DATA AUGUST
540 DATA"BR32BD46H6R32U38G28R28U
28R4ND28D8F22L22D8L4R36G6BR20G4L
4H4G4L4H4G4L4H4G4L4H4G4L4H4G4L4H
4G4L4H4G4L4H4BD10BR4ND8R6D4NL6D4
NL6BR8U8L4R8BR4D8U4R6D4U8"
545 DATA JULY AND SEPTEMBER
550 DATA "BR12BD28NR6D6R6D6NL6BR
6NR6U6NR6U6R6BR6D12U6NR6U6R6ND6B
R4R4ND12R4BR4NR6D6NR6D6R6BR6U12R
4ND12R4ND12BR6NL2ND12R6D6NL6D6NL
8BR6NR6U6NR6U6R6BR6ND12R6D6L6F6B
U20NL104BD28L104"
555 DATA SEPTEMBER
560 DATA "BR40BD20L4D4R4D4NL4BR4
NR4U8R4BR4D8U4R4U4D8BR4U8R4D8NL4
BR4U8R4D8NL4BR4NU8R4BR8R6H20L32G
20R6D16R58NU16L8U10L6ND10BL8L4D4
R4U4BL12L4D4R4U4BL12L4D4R4U4BD22
BL24ND4R6D4NL4D4BR8U8L4R8BR4D8U4
R6D4U8"
565 DATA AUGUST AND OCTOBER
570 DATA "BR16BD28ND12R8D12NL8BR
6NR8U12R8BR4R6ND12R6BR4NR8D12R8U
12BR4R2ND12R8D6NL8D6NL10BR6NR8U6
NR8U6R8BR6ND12R8D6L6F6BR8BU20NL1
04BD28L104"
575 DATA OCTOBER
580 DATA"BR56BD14ND30R8F4D22G4L1
6H4U22E4NR8G2L6G4D18F4R6L12H6U14
E6R6BR28R6F4D18G4NL6R6E6U14H6L6B
L16BU4U4E6L4G6D4BD14L8E4ND2F4BR4
R8H4ND2G4L2D2NG4F4NL8BD6L10NH2R1
2E2BD20BL52NG2ND8BR4ND8R6D8NL6BR
10U8L4R8BR4D8U4R6D4U8"
585 DATA SEPTEMBER AND NOVEMBER
590 DATA"BR14BD28ND12M+8,+12U12B
R4NR8D12R8U12BR4D8F4E4U8BR4NR6D6
NR6D6R6BR4U12R6ND12R6D12BR4R2U12
L2R10D6NL8D6NL8BR4NR8U6NR8U6R8BR
4ND12R8D6L6F6BR4BU20NL104BD28L10
4"
595 DATA NOVEMBER
600 DATA"BR20BD40R80U4L80ND4R8U6
R4E2U2E2U2E2R2E2R2E2R16NE6G8D4F4
R8E4U4H4E8NG4H4U4R4F4D2G2L2BD4NL
4F4R2F2R2F2D2F2D2F4BL80BD22NG2ND
8BR8NG2ND8BR6R4ND8R4BR4D8U4R6D4U
8"
605 DATA OCTOBER AND DECEMBER
610 DATA"BR14BD28R2ND12R8D12NL10
BR4NR6U6NR6U6R6BR4NR8D12R8BR4NR6
U6NR6U6R6BR6ND12R6ND12R6D12BR4R2
U12L2R10D6NL8D6NL8BR4NR8U6NR8U6R
8BR4ND12R8D6L6F6BR4BU20NL104BD28
```

```
L104"
615 DATA DECEMBER
620 DATA"BR34BD12G6R4G6R4G6R4G6R
26H6R4H6R4H6R4H6L2BD8NR2BD4NR2BD
4NR2BD4NR2BD4NR2BD2D4R2NU4BR36R8
L2U2L4R2U12NU12L4NU10L4NU10L4NU1
0L4NU10R20NU10R4NU10R4NU10R4NU10
BD28BL82NG2ND8BR6R6D4L6D4R6BU8BR
6R4ND8R4BR4D8U4R6D4U8"
625 DATA NOVEMBER AND JANUARY
630 CLS:V=1
635 FORI=1TO12
640 AO(I)=RND(12)
645 IF N(AO(I))=1 THEN 640
650 N(AO(I))=1:NEXTI
655 FOR P=1TO12
660 CLS
665 PRINT@68,"WHICH MONTH COMES
BETWEEN"
670 PRINT@132,C$(AO(P))+" ?"
675 FOR Q=1TO2
680 C(Q)=RND(10):IF C(Q)=AO(P) T
HEN680
685 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN680
690 NEXTK
695 NEXTQ:C(3)=AO(P)
700 FOR E=1TO3
705 F(E)=RND(3)
710 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN705
715 NEXTK:NEXTE
720 PRINT
725 PRINTTAB(8)"A-"+B$(C(F(1))):
PRINT
730 PRINTTAB(8)"B-"+B$(C(F(2))):
PRINT
735 PRINTTAB(8)"C-"+B$(C(F(3))):
PRINT
740 G$=INKEY$:IFG$="@"THEN800
745 IF G$=""THEN740
750 G=ASC(G$)-64
755 IF G<1 THEN 740
760 IF G>5 THEN 740
765 IF C(F(G))<>AO(P) THEN780
770 PRINT:PRINT" RIGHT! THE ANSW
ER IS: "+B$(AO(P))
775 NC=NC+1:GOTO790
780 PRINT:PRINT" SORRY! THE ANSW
ER IS: "+B$(AO(P))
785 NW=NW+1
790 X$=INKEY$:IFX$<>CHR$(13)THEN
790
795 NEXT P
800 CLS:PRINT@101,"YOU TRIED"NC+
NW"TIMES &":PRINT@165,"ANSWERED"
NC"CORRECTLY"
805 PRINT@229,"WHILE DOING"NW"WR
ONG."
810 NQ=NC+NW:IF NQ=0THEN NQ=1
815 MS=INT(NC/NQ*100)
820 PRINT@293,"YOUR SCORE IS"MS"
%."
825 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
830 X$=INKEY$:IFX$="Y"THEN RUN
835 IFX$="N"THENCLS:END
840 IFX$="C"THEN850
845 GOTO830
850 IFV=1THEN660
855 IFV=0THEN275
```

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BASICally Q&A Speaking

By Larry Boeldt

Editor's Note: This issue marks Larry Boeldt's solo debut as editor of RAINBOW's "BASICally Speaking" column, an assignment handed over to him by the RAINBOW and an extremely busy Bill Bernico. As previously, "BASICally Speaking" will continue to address and solve your programming problems.

Dear Larry:

I'm an amateur radio operator and have been the proud owner of a CoCo 3 for the past five months. I would like to know if the CoCo 3 is capable of receiving international Morse code through some means of decoder circuit and print text on the screen. What ports would I have to use, and how would the sofware be written?

Dwayne Fitzgerald
Wilson's Beach, New Brunswick

Dear Dwayne:

To my knowledge there is no such device for the Color Computer. You might try to contact a hardware producer or even Tandy to find out if such a product is available.

Dear Larry:

Is there an easy way to change graphics statements like `LINE`, `DRAW` *and* `CIRCLE` *in a CoCo 2 program to* `HLINE`, `HDRAW` *and* `HCIRCLE` *statements on the CoCo 3?*

Danna Aschenbach
Rock Springs, Wyoming

Dear Danna:

This could not be more timely. You can convert the program in this column [See the following letter.] that changes `PRINT` statements to `PRINT#-2`, statements to work for graphics commands as well. The graphics, of course, would only show up on the left portion of the screen, but it saves a lot of typing. The same rules apply for the graphics conversions. Don't forget to save the program in the ASCII format.

Just change the lines in the program as follows:

```
72 INPUT"ENTER THE COLOR COMPUTE
R 2 COMMAND;"C2$
220 OF=INSTR(OF,A$,C2$)
240 A$=LEFT$(A$,OF-1)+"H"+RIGHT$
(A$,LS-OF):OF=OF+LEN(C2$)
```

Don't forget that you must select the proper `HSCREEN` before the graphics are drawn. You must run this program for each command you want to convert. It saves a lot of time compared to searching for each command individually.

Dear Larry:

There is a program in the February 1983 RAINBOW that converts `PRINT` *statements to* `PRINT #-2`, *statements. I am having trouble using this program on a disk system. Could you convert the program to work on a CoCo with disk?*

Earl Jesse Foster
Lynchburg, Virginia

Dear Earl:

According to the program's writer, the program should work fine on a disk system — except for the `CSAVEM` command, which should be replaced with a `SAVEM` command.

Here is a program written in BASIC that will do the same thing. As with both programs, the assumption is made that each line of a BASIC program contains no more than 240 characters. To be converted the program must be saved in the ASCII format `SAVE"` *filename* `",A`.

The Listing: `CONVERT`

```
10 ' BASIC STATEMENT CONVERTER
20 ' WRITTEN BY LARRY BOELDT FOR
30 ' RAINBOW MAGAZINE BASICALLY
40 ' SPEAKING COLUMN.
50 ' COPYRIGHT (C) 1989
60 ' 65 CLEAR 14000:DIM L$(500)
70 INPUT"ENTER THE PROGRAM NAME;"F$
80 OPEN"D",#1,F$,1
90 FIELD #1,1 AS A$
100 X=0:B=1
110 GET #1,B:B=B+1
120 IF B=LOF(1) THEN CLOSE:GOTO200
130 IF A$=CHR$(13) THEN 150
140 L$(X)=L$(X)+A$:GOTO 110
150 X=X+1:GOTO 110
160 '
200 FOR R=1 TO X:A$=L$(R):OF=1
210 LS=LEN(A$):IF LS>240 THEN PRI
NT"LINE ";LEFT$(A$,INSTR(A$," "))
;" IS TOO LONG:"GOTO 300
220 OF=INSTR(OF,A$,"PRINT")
230 IF OF=0 THEN 300
240 OF=OF+4:A$=LEFT$(A$,OF)+"#-2,
"+RIGHT$(A$,LS-OF)
260 GOTO 210
300 L$(R)=A$:NEXT R
310 OPEN"O",#1,F$
320 FOR R=1 TO X
330 PRINT #1,L$(R)
340 NEXT R
350 CLOSE #1
```

Thanks for the questions. Keep 'em coming!

Larry Boeldt has five years of experience on the Color Computer and owns a CoCo-based company geared toward customizing software for businesses.

Questions about specific BASIC programming problems can be addressed to BASICally Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. We are unable to answer letters individually.

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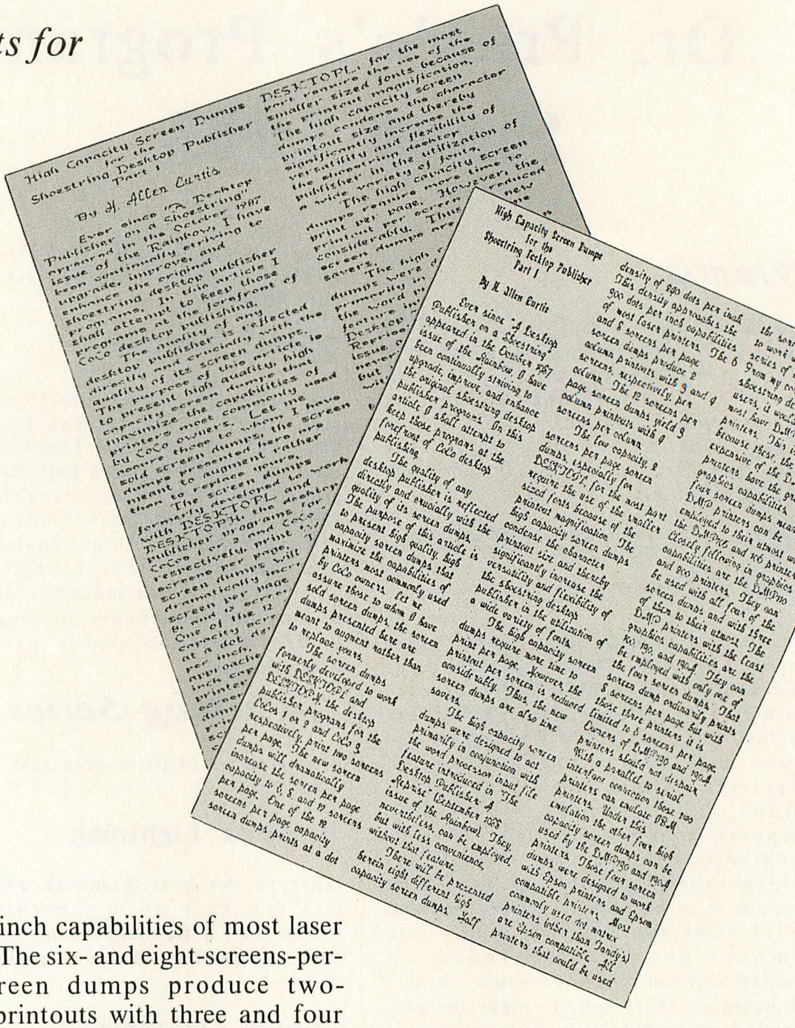

High Capacity Screen Dumps for the Shoestring Desktop Publisher, Part I

By H. Allen Curtis

Ever since "A Desktop Publisher on a Shoestring" appeared in THE RAINBOW (October '87 Page 58), I have been continually striving to upgrade, improve and enhance the original shoestring desktop publisher programs.

The quality of any desktop publisher is reflected directly and crucially with the quality of its screen dumps. The purpose of this article is to present high-quality, high-capacity screen dumps that maximize the capabilities of printers most commonly used by CoCo owners. Let me assure those who own screen dumps that those presented here are meant to augment rather than to replace them.

The screen dumps formerly developed to work with *Desktop Low* (DESKTOPL) and *Desktop High* (DESKTOPH), the desktop publisher programs for the CoCos 1, 2 and 3, print two screens-per-page. The new screen dumps dramatically increase the screen-per-page capacity to six, eight and 12 screen dump prints at a dot density of 240 dots-per-inch. This density approaches the 300 dots-per-inch capabilities of most laser printers. The six- and eight-screens-per-page screen dumps produce two-column printouts with three and four screen dumps per column. The 12-screens-per-page screen dumps yield three-column printouts with four screens per column.

The low-capacity, two-screens-per-page screen dumps, especially for DESKTOPL often require the use of the smaller-sized fonts because of the printout magnification. The high-capacity screen dumps condense the character printout size and thereby significantly increase the versatility and flexibility of the shoestring desktop publisher in the utilization of a wide variety of fonts.

The high-capacity screen dumps require more time to print per page. However, the printout time per screen is reduced considerably. Thus, the new screen dumps are also time savers.

These screen dumps were also designed to act primarily in conjunction with the word processor input file feature introduced in "The Desktop Publisher: A Reprise" (September '88, Page 102). Nevertheless, they can be employed, but with less convenience without that feature.

There are eight different high capacity screen dumps presented here. Half of them were written to work with the Tandy DMP series of dot-matrix printers. From my correspondence with shoestring desktop publisher users, it appears that most have DMP-105 and -106 printers, the least expensive of the DMP printers but with of the greatest graphics capabilities. All four screen dumps meant for DMP printers can be employed to their utmost with the DMP-105 and -106 printers.

Closely following in graphics capabilities are the DMP-110 and -200 printers, which can be used with all four of the screen dumps and with three of them to their utmost. The DMP printers with the least graphics capabilities are the 100, 130 and 130A, able to be employed with only one of the four screen dumps. Screen dumps ordinarily print eight screens per page, but with those three printers it is limited to six. Owners of DMP-130 and -130A printers should note that with a parallel-to-serial-interface connection the two printers

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H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th century history and enjoys biking through the colonial capital. He balances past and present with his computer work.

can emulate IBM printers. Under this emulation the other four high-capacity screen dumps can be used by the DMP-130 and -130A printers.

Four screen dumps were designed to work with Epson printers and the commonly used Epson-compatible printers. All printers used with the screen dumps SCRNDMP and SCRNDMPS of "Screen Dump Extraordinaire" (October '87, Page 30) are Epson-compatible insofar as their graphics capabilities are concerned.

For DESKTOPL there are two BASIC driver programs, each servicing two high-capacity screen dumps, one for DMP printers, the other for Epson compatible printers. There are also two BASIC driver programs with similar functions for DESKTOPH. Both DESKTOPL and DESKTOPH will be modified to give their O commands a high-capacity screen dump option.

After the screens — six, eight or 12 — intended for a printed page are generated and saved, the high-capacity screen dump option of the O command should be chosen. This causes the automatic loading and running of the appropriate BASIC driver program. After the driver-initiated printout is completed, the driver optionally allows another printout, program termination, or an automatic loading and running of DESKTOPL or DESKTOPH.

Desktop Low Printouts

The BASIC printer drivers used in conjunction with DESKTOPL are shown in listings 1 and 2. DRIVERLT, the program of Listing 1, is the driver for DESKTOPL and Tandy DMP printers. Likewise, DRIVERLE, the program of Listing 2, is the driver for DESKTOPL and Epson-compatible printers.

DESKTOPL must be altered to work with DRIVERLT or DRIVERLE by merging to it one of four patch programs, LALTER, LALTERD, LALTERE and LALTERDE, of listings 3, 4, 5 and 6 respectively. Which patch program to merge with DESKTOPL depends on the version of the program used. Presently there are effectively four versions of DESKTOPL, which are an outgrowth of selling many DESKTOPL users built-in screen dumps, enhancements or both.

Table 1 shows with which version of DESKTOPL each program of listings 3 to 6 is associated. Any of the four effective versions of DESKTOPL may or may not include the word processor input file feature. Moreover, these four versions may accommodate two, 10 or 19 fonts, depending on whether additional fonts were purchased. If you use the version of DESKTOPH published in RAINBOW use the LALTER patch file from Listing 3.

Each patch program gives the O command of DESKTOPL the ability to transfer control to DRIVERLT or DRIVERLE. Those with Epson-compatible printers need to change Line 645 of the patch program associated with their version of DESKTOPL by replacing DRIVERLT with DRIVERLE.

The powers of the O command are expanded further by each patch program. It adds an option to the O command allowing you to look at the directory of the disk in Drive O. For later printing, you can save six, eight or 12 screens on disk by means of the O command using the save screen option. To keep track of files already on disk you can occasionally use the directory option of the O command. If you have more than one drive and have fonts, DESKTOPL has the ability to address drives when saving screens. You may in such a case save screen files on a disk in a drive other than Drive O. You should then append to DIR in Line 645 a drive number one, two or three corresponding to the drive used.

When the patch program for DESKTOPL version is typed, if you have made any changes in Line 645, save it in ASCII form. If you choose to save LALTERD, for instance, in ASCII form, type `SAVE"LALTERD",A` and press ENTER.

To alter DESKTOPL, do the following: Get out the disk containing DESKTOPL and its font files; Make a backup copy of the disk; and put away the original and work with the backup copy. For compatibility with DRIVERLT or DRIVERLE, DESKTOPL must have the filename DL.

Therefore, insert DESKTOPL in the disk drive and type: `RENAME"DESKTOPL/BAS"TO"DL/BAS"` and press ENTER. Next, type `LOAD"DL"` and press ENTER. Then, insert the disk containing patch program LALTER, LALTERD, LALTERE, or LALTERDE. If the program is LALTERDE, for example, then type: `MERGE" LALTERDE"` and press ENTER.

You would do similarly for any one of the other three patch programs but with its name instead of LALTERDE. Finally, insert the disk containing DL in your drive and type `SAVE"DL"` and press ENTER.

Depending on the printer, you may need to change some lines of the driver program DRIVERLT or DRIVERLE. The poke command in Line 5 of each of these programs is employed to set the baud rate of each particular printer. If the printer operates at 600 baud, you don't need to change Line 5. Otherwise, delete the apostrophe from Line 5 and replace the question mark with the value associated with the baud rate of your printer.

Baud Rate	**Value**
1200	41
2400	18
4800	6 or 7
9600	1

If you have a DMP-110 or -200 printer, change lines 720 and 740 of DRIVERLT to include "elongation on" and "elongation off" printer control codes. In particular, replace `CHR$(19)` with `CHR$(14)` in Line 720. Also insert, `CHR$(27);CHR$(15)` between `2` and `:` in Line 740.

Line 680 was written for the 800 dots-per-line graphics mode of the DMP-105 and -106 printers. If your printer has a 960 dots-per-line graphics mode, delete Line 680.

If you have a printer that is Epson-compatible but is not an Epson, you may need to tailor DRIVERLE to fit the needs of your printer. The tailor-making process, though somewhat tedious, is well worth the effort.

It involves changing eight DATA statements containing Epson printer control code sequences. Lines 570 through 600 contain the control codes for a two-column printout. Similarly, lines 650 through 680 hold the control codes needed for a three-column printout.

DESKTOPL Version	**Patch Program**
Neither Dump nor Enhancements	LALTER
Dump	LALTERD
Enhancements	LALTERE
Both Dump and Enhancements	LALTERDE

Table 1

Final Two Characters of Filename	Screen Image Printout Destination
L1	Top 1/3 of Left Column
L2	2nd 1/3 of Left Column
L3	Bottom 1/3 of Left Column
R1	Top 1/3 of Right Column
R2	2nd 1/3 of Right Column
R3	Bottom 1/3 of Right Column

Table 2. Filename Structure for Two-Column, Six-Screen Printout

Final Two Characters of Filename	Screen Image Printout Destination
L1	Top 1/4 of Left Column
L2	2nd 1/4 of Left Column
L3	3rd 1/4 of Left Column
L4	Bottom 1/4 of Left Column
R1	Top 1/4 of Right Column
R2	2nd 1/4 of Right Column
R3	3rd 1/4 of Right Column
R4	Bottom 1/4 of Right Column

Table 3. Filename Structure for Two-Column, Eight-Screen Printout

Final Two Characters of Filename	Screen Image Printout Destination
L1	Top 1/4 of Left Column
L2	2nd 1/4 of Left Column
L3	3rd 1/4 of Left Column
L4	Bottom 1/4 of Left Column
M1	Top 1/4 of Middle Column
M2	2nd 1/4 of Middle Column
M3	3rd 1/4 of Middle Column
M4	Bottom 1/4 of Middle Column
R1	Top 1/4 of Right Column
R2	2nd 1/4 of Right Column
R3	3rd 1/4 of Right Column
R4	Bottom 1/4 of Right Column

Table 4. Filename Structure for Three-Column, 12-Screen Printout

The first DATA value in each of the lines specifies the *number* of values in the control code sequence represented by the remainder of the DATA statement. Lines 570 and 650 are identical and specify the control code sequence for line spacing.

For ordinary printing, the printer provides a line spacing of 1/6 inch that produces six lines of print per inch. For the printer graphics modes, the line spacing must be a closer 7/72 inch. The Epson control code sequence that yields the required line spacing is 2, 27, 49. In lines 570 and 650 the initial value of 2 indicates that the following two values 27 and 49 represent the control code sequence. Check your printer manual to see whether or not 27, 49 is the control code sequence for a line spacing of 7/72 inch. If not, modify lines 570 and 650 accordingly. If it has three values, for instance, in addition to changing the control code sequence, you need to alter the initial value to 3. In such a case the DATA statement ends with four 0 values instead of five required for the Epson printer.

Your printer may automatically adjust the line spacing to fit the graphics modes, wherein you just need to replace the initial value 2 in lines 570 and 650 with 0. However, if your printer does not have automatic line spacing adjustment and you make the 0 for 2 substitution, your printout will show noticeable gaps between lines.

BASIC lines 600 and 680 also deal with line spacing, holding control code sequences for the return to 1/6 inch line spacing. Therefore, check the manual for a 27, 50 control code sequence, and, if needed, make changes in lines 600 and 680 analogous to those in lines 570 and 650. The control code sequences in lines 580 and 660 differ only in their final value; 5 and 9, indicating a left margin five and nine characters wide. Check your manual for a control code sequence 27, 108, *n* where *n* is a value to indicate the character width of the left margin, making any needed modifications in lines 580 and 660.

Lines 590 and 670 contain the Epson control code sequences for specifying the graphic modes. The mode designated by Line 590 is the one with a dot density of 576 dots per line (72 dots per inch). The last two values of that code sequence indicate a maximum of 2*256=512 dots (the width of two screens) that are to be printed per line. If your printer manual has a different control code sequence for this graphics mode, change line 590 so that the code specifies a maximum of 512 dots printed per line.

Line 670 holds the control code sequence for the graphics mode with a dot density of 960 dots per line (120 dots per inch). The last two values of the Epson control code sequence specify a maximum of 3*256=768 dots to be printed per line. Again, if your printer requires another control code sequence for the 960 dots per line mode, modify Line 670 accordingly, making the change in such a way that the code provides for a maximum of 768 dots printed per line.

A few tips on the typing of the driver program, DRIVERLT or DRIVERLE, should prove helpful. Before you run the driver being typed, save it on disk. Each driver contains some pokes to memory, which, if involved in a typing error, can cause the loss of the whole program when it is run. After saving the driver in its entirety, run it, and when asked for a two- or three-column *printout*, press 3. If you made an error in the difficult-to-type DRIVERLT lines 80 through 220 or DRIVERLE lines 80 through 140, the program will stop and report the number of the line in which the error occurs. Respond to the error report by comparing your erroneous line with the correct rendition in the listing and rectify the error. Rerun the program and correcting process *until* the driver executes the screen replaced with another prompt screen. Press BREAK to stop the program.

Next, run the program and press 2 for a two-column printout. DRIVERLT will follow with another prompt, which you may answer by pressing 1 or 2. Then the

Each Screen Destined for the Left Column Printout			Each Screen Destined for Right Column Printout		
Margins			Margins		
Top	Left	Right	Top	Left	Right
0	16	237	0	3	224

Table 5. Margin Settings for Two-Column, Six-Screen Printout

Each Screen Destined for Left Column Printout			Each Screen Destined for Right column Printout		
Margins			Margins		
Top	Left	Right	Top	Left	Right
0	0	252	0	3	256

Table 6. Margin Settings for Two-Column, Eight-Screen Printout

request for a few moments wait occurs. If DRIVERLT was mistyped, lines 380 through 500 or DRIVERLE lines 290 through 340, the program will stop and report the errored line, allowing you to correct it. Repeat running and correcting the program until it can execute beyond the screen containing the few moments wait request. Finally, save the driver program on disk.

Each of DRIVERLT and DRIVERLE provides prompts and messages to lead you through the program in effecting the desired two- or three-column printout. You must, however, have ready on disk the required screen files previously saved by the desktop publisher program DL. The eight or less character filename of each screen file must adhere to the structure described in Tables 2, 3, or 4. In the three tables, the heading *Screen Image Printout Destination* refers to the location on the printed page of the screen image.

The patch programs of listings 3, 4, 5 and 6 have given the program DL a handy new feature that promotes pleasing two- and three-column printouts. DL now positions every character of any font within a vertical distance of eight, 12, 16 or 24 dots on the screen with each distance divided evenly into the 192 dot vertical size of a DL screen. This means that with a top margin setting of zero via the M command of DL, each screen will hold exactly 24, 16, 12 or eight lines of characters depending on the font in use. This guarantees that in a printout of two screen images, one above the other in a column, the spacing between screen images will be indistinguishable from the spacing between lines of either screen image written with the same font.

Tables 5, 6, and 7 give the margin settings specified by DL's M and W commands that produce pleasingly spaced two- and three-column high capacity printouts. It must be pointed out that the right margin setting for the screens intended for a two-column, six-screen printout must not exceed 240. The reason is that for such a printout, a 480 dots-per-line graphics mode must be used and each column of the printout cannot exceed 240 dots of the 480 dots per line.

A typical session for producing a two-column printout is as follows: It is assumed that you will be making use of the word processor input file feature of DL. If your copy of DL does not have this feature, you will have to write a screen when others are employing the feature. It is also assumed that you have on a disk the word processor file in proper form for input. The disk should otherwise be blank.

Suppose the filename of the file is MYDOC. Your printer should be ready to use. Load and run DL. Select a font most suitable for your prospective two-columned document. If you have a DMP-105, DMP-106 or Epson compatible printer, make the left-column margin settings in accordance with Table 6; otherwise, according to Table 5. If you have only one disk drive or if your copy of DL cannot address drives when saving screens, there's no need to swap the DL disk with the one containing MYDOC.

Next, by means of the ASCII input option of the I command, employ the word processor input feature to fill a screen. When the screen is full, opt to have the remainder of the MYDOC file recorded in a file called REST. Take this option every time you fill a screen and employ the O command to save the screen on disk.

Choose a filename that is six or less characters in length, for example, DUMP. Then, when saving the screen, type the filename as DUMPL1, where the final two characters indicate that the screen image is to be printed as the top part of the left column of the page. If your disk containing MYDOC is in a drive other than 0, you must append to the filename the usual colon and drive number.

Now, clear the screen and use the word processor input feature to bring in information from REST. Save the screen as previously, but this time use the filename DUMPL2, repeating the process used to obtain the second screen file. Save the third screen as DUMPL3. If you used Table 6 to make the margin settings, repeat the process again to save another screen as DUMPL4. After saving a full column of screens, make the right margin settings in accordance with Table 5 or 6 again. Clear the screen and input another, saving it as DUMPR1. Continuing the process analogously until all six or eight screens have been saved.

Suppose REST becomes empty before all the required screens have been filled and saved. Nevertheless, you need a full complement of screens saved on disk. Suppose that you were able to save seven screens of an eight-screen printout. In such a case, clear the screen and save it as DUMPR4. At this point, make certain that the disk containing DRIVERLT or DRIVERLE is in Drive 0. (It is convenient to have that program recorded on the disk containing DL.)

Select the high capacity screen dump option of the O command to load and run the program. Answer the two- or three-column prompt by pressing 2. DRIVERLT will ask you to press *1* if you have a DMP-105 or -106, otherwise press 2. Type the appropriate number and you will be asked if you need reminders about file and filename requirements, after which, you are given three options. Take the option to load screens for dumping. If you do not have more than one disk drive, now insert the disk containing the screen files you just saved. When asked for a filename, enter DUMP if the screen file disk is in Drive 0; otherwise, enter DUMP; and the appropriate disk drive number. The driver

Screen Destined for Left Column Printout			Screen Destined for Middle Column Printout			Screen Destined for Right Column Printout		
Margins			Margins			Margins		
Top	Left	Right	Top	Left	Right	Top	Left	Right
0	0	251	0	3	253	0	5	256

Table 7. Margin Settings for Three-Column, 12-Screen Printout

program will load `DUMPL1` and `DUMPR1`, initiating the appropriate screen dump and printing will ensue. When the screens of `DUMPL1` and `DUMPR1` are printed, the driver loads `DUMPL2` and `DUMPR2` and printing resumes. This process continues until the two-column printout is complete, at which time there is given three options. If choosing the option to return to `DL`, check that the `DL` disk is in Drive 0, which loads and runs `DL`. If the file `REST` contains more information, prepare screen files for a second two-column printout.

If writing a newsletter, for instance, it's possible to have the newsletter name span the two or three columns of the printout. The following example indicates how this is done.

Select a large sized font, say Font 1. Suppose your newsletter, *The CoCo-Nut Chronicle*, requires a two-column printout. Clear the screen. Press the space-bar and then type `The CoCoNu`. By means of the T command, set both tabs to either 240 or 250, depending on whether the printout requires six or eight screens. Then press the down-arrow key to move the cursor to the right (at 240 or 250). Augmenting the word processor input feature is the ability to move a printed line left or right. Make use of that ability by pressing Shift-up Arrow until the `u` of `The CoCoNu` is almost touching the cursor at 240 or about a third of the way past the cursor if it is at 250. Select a suitable font. Make the left margin settings according to Table 5 or 6. Then press enter twice. Use the word processor feature to fill the rest of the screen and save it as the top left column screen.

After saving all the screens for the left column; clear the screen; choose Font 1; using the M command, set the top and left margins to 0; and type `t Chronicle`. Select the text font again; make the right margin settings in accordance with Table 5 or 6; position down from the newsletter name by pressing ENTER twice; and fill the rest of the screen and save it as the top right column screen.

If you do not have a word processor, install the word processor input feature in `DL` to acquire the ability to move printed lines. (See September '88 issue, Page 102.)

110	78	500	2
200	102	620	183
310	66	720	198
390	103	END	46

Listing 1: `DRIVERLT`

```
5 'POKE150,?
10 GOTO30
20 CLEAR200,&H62FF:GOTO40
30 PCLEAR8:GOTO20
40 CLS:PRINT@67,"HIGH CAPACITY S
CREEN DUMPS":PRINT@103,"FOR TAND
Y PRINTERS":PRINT@134,"BY H. ALL
EN CURTIS":PRINT@167,"FOR FALSOF
T,INC":PRINT@233,"COPYRIGHT 1989
"
50 PRINT@321,"TYPE 2 OR 3 DEPEND
ING ON          WHETHER YOU WANT A
 2 OR 3         COLUMN PRINTOUT, R
ESPECTIVELY.
60 DIMS$(14),C(14):C=0:X=&H6300:
W$(0)="12":W$(1)="TRIO":W$(2)="1
/4":W$(3)=", M1"::M$="PRESS SPAC
E TO CONTINUE
70 L$(1)="L1":L$(2)="L2":L$(3)="
L3":L$(4)="L4":M$(1)="M1":M$(2)=
"M2":M$(3)="M3":M$(4)="M4":R$(1)
="R1":R$(2)="R2":R$(3)="R3":R$(4
)="R4":K=1
80 S$(0)="1F31860F8D2227028A108D
1927028A208D1327028A40437EA285C6
80D750":C(0)=2488
90 S$(1)="8DE0045026FA3930882 0E6
84D450391F314F8DF627028A018DED27
028A02":C(1)=3006
100 S$(2)="8DE727028A048DE127028
A088DDB20BAC680D7508DDB045026FA3
9861B97":C(2)=3408
110 S$(3)="52108E67FA8D0D8D2D8D1
D8D1B8D190A5226EE39860D8D0D861B8
D09861 0":C(3)=2624
120 S$(4)="8D054F8D0286607EA285E
EA48DC633410A5126F83301EFA1C620D
751398D":C(4)=3429
130 S$(5)="DB8DF7108E67FA8D068D0
48D0220B2EEA417FF7033410A5126F72
0DA8D09":C(5)=3447
140 S$(6)="8DDF860D21C50F6F39C6F
ED76F86128DBA8E67FACE6800EF81DEB
CEF8133":C(6)=4183
150 S$(7)="C91800EF81398DE38D968
DB217FF76C6608D0AC6608D14C6608D1
820C78E":C(7)=3756
160 S$(8)="6500FE67FAA6C0A7805A2
6F9398E6600FE67FC20F08E6700FE67F
E20E88D":C(8)=4181
170 S$(9)="AEC6808E65508DDC3440C
68 08E66608DE13440C6808E67608DE03
4408D20":C(9)=3785
180 S$(10)="3540FF67FE3540FF67FC
3540FF67FA861A17FF19C6C08DABC6C0
8DB5C6C0":C(10)=4448
190 S$(11)="209FCE6500FF67FACE66
00FF67FCCE6700FF67FE860117FEF639
17FF56C6":C(11)=4222
```

```
200 S$(12)="208E65C08D843440C620
8E66C08D893440C6208E67C08D883440
8DC83540":C(12)=3434
210 S$(13)="FF67FE3540FF67FC3540
FF67FA17FEC18E6540C6E08D19C64017
FF4DC640":C(13)=4308
220 S$(14)="17FF56C64017FF598D9E
861EBDA28516FF0086FFA780A780A780
5A26F739":C(14)=3923
230 K$=INKEY$:IFK$=""THEN230ELSE
IFK$="2"THEN350ELSEIFK$<>"3"THEN
SOUND60,3:GOTO230
240 CLS:PRINT@98,"ONLY A PRINTER
 (SUCH AS DMP     105, 106, 110,
 & 200) WITH AN   800 OR MORE DO
TS PER LINE       GRAPHICS MODE
CAN PRODUCE       A PROPER 3 COL
UMN PRINTOUT.":PRINT@326,"A FEW
MOMENTS PLEASE"
250 FORI=0TO14:FORJ=1TO30:A$=MID
$(S$(I),2*J-1,2):A=VAL("&H"+A$):
C=C+A:POKEX,A:X=X+1:NEXT:IFC<>C(
I)THENCLS:PRINT@226,"TYPING ERRO
R IN LINE";80+10*I:ENDELSEC=0:NE
XT
260 GOSUB760
270 K$=INKEY$:IFK$=""THEN270ELSE
IFK$="N"THEN610
280 GOSUB770
290 K$=INKEY$:IFK$=""THEN290
300 GOSUB790
310 PRINT"  OF A TRIO OF FILES I
NDICATE     THE LEFT, MIDDLE, AN
D RIGHT     PARTS OF THE TOP 1/4
 OF THE     PRINTOUT.  L2, M2 AN
D R2        INDICATE THE NEXT 1/
4, ETC.     EXCEPT FOR THE LAST
2           ";
320 PRINT"CHARACTERS, THE FILENA
ME OF     ALL FILES MUST BE THE
SAME.":PRINT@485,M$;
330 K$=INKEY$:IFK$=""THEN330
340 GOTO610
350 CLS:PRINT@162,"IF YOU HAVE A
 PRINTER WITH A     576 DOTS PER
LINE GRAPHICS       MODE (SUCH AS
 THE DMP105 AND     DMP106), THEN
 PRESS 1.           OTHERWISE, PR
ESS 2.
360 K$=INKEY$:IFK$=""THEN360ELSE
W$(1)="PAIR":W$(3)="    ":IFK$="
1"THENK=4:W$(0)="8"ELSEIFK$="2"T
HENK=3:W$(0)="6":W$(2)="1/3"ELSE
SOUND60,3:GOTO360
370 PRINT@422,"A FEW MOMENTS PLE
ASE";
380 S$(0)="1F31860F8D227028A108
D1927028A208D1327028A40437EA285C
```

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```
680D750":C(0)=2488
390 S$(1)="8DE0045026FA39308820E
684D450391F314F8DF627028A018DED2
7028A02":C(1)=3006
400 S$(2)="8DE727028A048DE127028
A088DDB20BAC680D7508DDB045026FA3
9861B97":C(2)=3408
410 S$(3)="528D1B8D538DEB33410A5
126F88D458DE133410A5126F88D3B0A5
226E439":C(3)=3027
420 S$(4)="860D8D0D861B8D098610 8
D054F8D0286207EA285DEBC31C918008
DE88D1C":C(4)=2943
430 S$(5)="17FF813341 0A5126F78D0
D17FF763341 0A5126F78D0220A933011
E32C620":C(5)=2647
440 S$(6)="D75139C6FED76F86128DC
A8DCB860D21C40F6F398D198DB08DE41
7FF86C6":C(6)=3991
450 S$(7)="60308D01298D15C660308
D02218D1520DEC6FED76FDEBC31C9180
039A6C0":C(7)=3300
460 S$(8)="A7805A26F939A6A0A7805
A26F9398DE3C680308D015A8DE6C6803
08D0252":C(8)=3728
470 S$(9)="8D11861A17FF44C6C0308
D00E58DD1C6C020BA8DD3346 0338D00D
731C901":C(9)=3588
480 S$(10)="008601 17FF27356 0398D
ACC620308D01838DAFC620308D027B8D
DA17FF0D":C(10)=3032
490 S$(11)="308D00F2C6D08D1DC640
308D00A88D94C640308D01A08DBF860D
17FF2286":C(11)=3452
500 S$(12)="1E17FF1D0F6F3986FFA7
80A7805A26F939C6908DF2C6C0308D01
7D20DBAC":C(12)=3786
510 FORI=0TO12:FORJ=1TO30:A$=MID
$(S$(I),2*J-1,2):A=VAL("&H"+A$):
C=C+A:POKEX,A:X=X+1:NEXT:IFC<>C(
I)THENCLS:PRINT@226,"TYPING ERRO
R IN LINE";380+10*I:ENDELSEC=0:N
EXT
520 GOSUB760
530 K$=INKEY$:IFK$=""THEN530ELSE
IFK$="N"THEN610
540 GOSUB770
550 K$=INKEY$:IFK$=""THEN550
560 GOSUB790
570 PRINT"  OF A PAIR OF FILES I
NDICATE      THE LEFT AND RIGHT P
ARTS OF      THE TOP ";W$(2);" OF
 THE PRINTOUT.    L2 AND R2 INDI
CATE THE NEXT      ";W$(2);", ETC
.  EXCEPT FOR THE.
580 PRINT"  LAST 2 CHARACTERS, T
HE           FILENAMES OF ALL FIL
ES MUST      BE THE SAME."
590 PRINT@485,M$;
600 K$=INKEY$:IFK$=""THEN600
610 GOSUB750
620 K$=INKEY$:IFK$=""THEN620
630 IFK$="3"THENCLEAR200,&H7FFF:
PCLEAR4:ENDELSEIFK$="2"THENCLEAR
200,&H7FFF:PCLEAR4:RUN"DL"ELSEIF
K$<>"1"THEN620
640 CLS:PRINT@98,"ENTER PART OF
FILENAME COMMON    TO ALL FILES.
 (IF YOU HAVE      MORE THAN 1 DR
IVE, YOU MAY       ADDRESS A DRIV
E BY APPENDING     A COLON FOLLOW
ED BY THE DRIVE    NUMBER TO THE
FILENAME PART.)
650 PRINT@324,">>>  ";:LINEINPUT
F$
660 A=INSTR(1,F$,":"):IFA>0THEND
$=RIGHT$(F$,LEN(F$)-A+1):F$=LEFT
$(F$,A-1)ELSED$=""
670 IFK>1THEN710ELSEX=&H6300:X(1
)=X+178:X(2)=X+216:X(3)=X+269:X(
4)=X+356
680 PRINT#-2,CHR$(27);CHR$(20);:
POKE&H637E,16
690 FORI=1TO4:LOADM F$+L$(I)+"/L
R"+D$,23040:LOADM F$+M$(I)+"/LR"
+D$:LOADM F$+R$(I)+"/LR"+D$,6144
:EXECX(I):NEXT
700 PRINT#-2:GOTO610
710 X=&H6300:X(1)=X+183:X(2)=X+2
00:X(3)=X+254:X(4)=X+309
720 IFK=3THENPOKEX+92,31:POKEX+1
24,57:POKEX+175,3:POKEX+179,30:P
OKEX+195,33:POKEX+288,88:PRINT#-
2,CHR$(27);CHR$(19);ELSEPRINT#-2
,CHR$(27);CHR$(31);CHR$(27);CHR$
(23);
730 FORI=1TOK:LOADM F$+L$(I)+"/L
R"+D$:LOADM F$+R$(I)+"/LR"+D$,61
44:EXECX(I):NEXT
740 PRINT#-2:GOTO610
750 CLS:PRINT@198,"1 LOAD FOR DU
MP":PRINT@230,"2 RETURN TO DESKT
OPL":PRINT@262,"3 EXIT PROGRAM":
RETURN
760 CLS:PRINT@194,"DO YOU NEED T
O REVIEW FILE       AND FILENAME
REQUIREMENTS        FOR EXECUTING
 THIS SCREEN        DUMP?    (Y/N)
  ";:RETURN
770 CLS:PRINT@66,"YOU SHOULD HAV
E READY ";W$(0):PRINT@98,"FILES
(SCREEN IMAGES) FOR          LOADIN
G.  THE IMAGES OF ONE      ";W$(1
);" OF FILES SHOULD CORRE-      S
POND TO THE TOP ";W$(2);" OF
     THE PRINTOUT. ";
780 PRINT"ANOTHER ";W$(1);"
 SHOULD CORRESPOND TO THE NEXT
 ";W$(2);" OF THE PRINTOUT, ETC.
":PRINT@453,M$;:RETURN
```

```
790 CLS:PRINT@34,"THE LAST 2 CHA
RACTERS OF EACH   FILENAME MUST
INDICATE WHERE    THE SCREEN IMA
GE IS TO BE       PRINTED.  FOR
EXAMPLE, L1";W$(3);"   AND R1 EN
DING THE FILENAMES":RETURN
```

110	186	520	71
200	234	610	16
330	91	END	85
420	109		

Listing 2: DRIVERLE

```
5 'POKE150,?
10 GOTO30
20 CLEAR200,&H66FF:GOTO40
30 PCLEAR8:GOTO20
40 CLS:PRINT@67,"HIGH CAPACITY S
CREEN DUMPS":PRINT@98,"FOR EPSON
 COMPATIBLE PRINTERS":PRINT@134,
"BY H. ALLEN CURTIS":PRINT@167,"
FOR FALSOFT,INC":PRINT@233,"COPY
RIGHT 1989"
50 PRINT@321,"TYPE 2 OR 3 DEPEND
ING ON          WHETHER YOU WANT A
 2 OR 3         COLUMN PRINTOUT, R
ESPECTIVELY.
60 C=0:X=&H6700:W$(0)="12":W$(1)
="TRIO":W$(2)="1/4":W$(3)=", M1"
:M$="PRESS SPACE TO CONTINUE
70 L$(1)="L1":L$(2)="L2":L$(3)="
L3":L$(4)="L4":M$(1)="M1":M$(2)=
"M2":M$(3)="M3":M$(4)="M4":R$(1)
="R1":R$(2)="R2":R$(3)="R3":R$(4
)="R4":K=1
80 S$(0)="1F314F8D4027028A808D37
27028A408D3127028A208D2B27028A10
8D25":C(0)=2068
90 S$(1)="27028A088D1F27028A048D
1927028A028D1327028A01437EA285C6
80D7":C(1)=2258
100 S$(2)="508DC3045026FA3930882
0E684D45039861897528D5A8D21108E6
7FA8D":C(2)=3220
110 S$(3)="0D8D0B8D09860D8DD40A5
226EA39EEA48DCE33410A5126F83301E
FA1C6":C(3)=3128
120 S$(4)="20D75139C6FED76F8D1B8
D238E67FACE6800EF81DEBCEF8133C91
800EF":C(4)=3973
130 S$(5)="818DB68D1B0F6F3934103
```

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```
08C278D183510393410308C2520F4341
0308C":C(5)=2214
140 S$(6)="2620ED3410308C2920E6E
6802708A680BDA2855A26F8390000000
00000":C(6)=2482
150 K$=INKEY$:IFK$=""THEN150ELSE
IFK$="2"THEN280ELSEIFK$<>"3"THEN
SOUND60,3:GOTO150
160 CLS:PRINT@230,"A FEW MOMENTS
 PLEASE"
170 FORI=0TO6:FORJ=1TO29:A$=MID$
(S$(I),2*J-1,2):A=VAL("&H"+A$):C
=C+A:POKEX,A:X=X+1:NEXT:IFC<>C(I
)THENCLS:PRINT@226,"TYPING ERROR
 IN LINE";80+10*I:ENDELSEC=0:NEX
T
180 FORI=1TO34:READA:NEXT:X=X-6:
FORI=1TO34:READA:POKEX,A:X=X+1:N
EXT
190 GOSUB610
200 K$=INKEY$:IFK$=""THEN200ELSE
IFK$="N"THEN480
210 GOSUB620
220 K$=INKEY$:IFK$=""THEN220
230 GOSUB640
240 PRINT"  OF A TRIO OF FILES I
NDICATE     THE LEFT, MIDDLE, AN
D RIGHT     PARTS OF THE TOP 1/4
 OF THE     PRINTOUT.  L2, M2, A
ND R2       INDICATE THE NEXT 1/
4, ETC.     EXCEPT FOR THE LAST 
2           ";
250 PRINT"CHARACTERS, THE FILENA
ME OF     ALL FILES MUST BE THE
SAME.":PRINT@485,M$;
260 K$=INKEY$:IFK$=""THEN260
270 GOTO480
280 K=2:W$(0)="8":W$(1)="PAIR":W
$(3)="     ":CLS:PRINT@230,"A FEW
 MOMENTS PLEASE"
290 S$(0)="1F314F8D4027028A808D3
727028A408D3127028A208D2B27028A1
08D252702":C(0)=2109
300 S$(1)="8A088D1F27028A048D192
7028A028D1327028A01437EA285C680D
7508DC304":C(1)=2637
310 S$(2)="5026FA3930882E684D45
039861897528D4E8D218DE333410A512
6F88D138D":C(2)=3298
320 S$(3)="D933410A5126F88D09860
D8DCA0A5226E0393301IE32C620D7513
9C6FED76F":C(3)=3254
330 S$(4)="8D0F8D17DEBC31C918008
DC28D1B0F6F39341030 8C278D183510 3
934103 08C":C(4)=2532
340 S$(5)="2520F4341030 8C2620ED3
4103 08C2920E6E6802708A680BDA2855
A26F83900":C(5)=3051
350 FORI=0TO5:FORJ=1TO31:A$=MID$
(S$(I),2*J-1,2):A=VAL("&H"+A$):C
=C+A:POKEX,A:X=X+1:NEXT:IFC<>C(I
)THENCLS:PRINT@226,"TYPING ERROR
 IN LINE";290+10*I:ENDELSEC=0:NE
XT
360 X=X-1:FORI=1TO34:READA:POKEX
,A:X=X+1:NEXT
370 GOSUB610
380 K$=INKEY$:IFK$=""THEN380ELSE
IFK$="N"THEN480
390 CLS:PRINT@66,"YOU SHOULD HAV
E READY 8 FILES   (SCREEN IMAGES
) FOR LOADING.
400 PRINT"  THE SCREEN IMAGES OF
 ONE PAIR   OF FILES SHOULD CORR
ESPOND TO   THE TOP FOURTH PART 
OF THE      PRINTED PAGE.  ANOTH
ER PAIR
410 PRINT"  SHOULD CORRESPOND TO
 THE NEXT   FOURTH PART OF THE P
AGE, ETC.":PRINT@453,M$;
420 K$=INKEY$:IFK$=""THEN420
430 CLS:PRINT@34,"THE LAST 2 CHA
RACTERS OF EACH   FILENAME MUST 
INDICATE WHERE    THE SCREEN IMA
GE IS TO BE       PRINTED.  FOR
INSTANCE, L1      AND R1 ENDING
THE FILENAMES
440 PRINT"  OF A PAIR OF FILES I
NDICATE     THE LEFT AND RIGHT P
ORTIONS     OF THE TOP FOURTH OF
 THE        PAGE.  L2 AND R2 IND
ICATE       THE NEXT FOURTH, ETC
.  EXCEPT
450 PRINT"  FOR THE LAST 2 CHARA
CTERS,      THE FILENAMES OF ALL
 FILES      MUST BE THE SAME."
460 PRINT@485,M$;
470 K$=INKEY$:IFK$=""THEN470
480 GOSUB560
490 K$=INKEY$:IFK$=""THEN490
500 IFK$="3"THENCLEAR200,&H7FFF:
PCLEAR4:ENDELSEIFK$="2"THENCLEAR
200,&H7FFF:PCLEAR4:RUN"DL"ELSEIF
K$<>"1"THEN490
510 CLS:PRINT@98,"ENTER PART OF
FILENAME COMMON   TO ALL FILES.
 (IF YOU HAVE     MORE THAN 1 DR
IVE, YOU MAY      ADDRESS A DRIV
E BY APPENDING    A COLON FOLLOW
ED BY THE DRIVE   NUMBER TO THE
FILENAME PART.)
520 PRINT@324,">>>  ";:LINEINPUT
F$
530 A=INSTR(1,F$,":"):IFA>0THEND
$=RIGHT$(F$,LEN(F$)-A+1):F$=LEFT
$(F$,A-1)ELSED$=""
540 IFK=1THENFORI=1TO4:LOADM F$+
L$(I)+"/LR"+D$,&H5A00:LOADM F$+M
$(I)+"/LR"+D$:LOADM F$+R$(I)+"/L
R"+D$,6144:EXEC&H6778:NEXTELSEFO
RI=1TO4:LOADM F$+L$(I)+"/LR"+D$:
LOADM F$+R$(I)+"/LR"+D$,6144:EXE
C&H6778:NEXT
550 GOTO480
```

```
560 CLS:PRINT@198,"1 LOAD FOR DU
MP":PRINT@230,"2 RETURN TO DESKT
OPL":PRINT@262,"3 EXIT PROGRAM":
RETURN
570 DATA 2,27,49,0,0,0,0,0
580 DATA 3,27,108,5,0,0,0,0
590 DATA 5,27,42,5,0,2,0,0,0,0
600 DATA 2,27,50,0,0,0,0,0
610 CLS:PRINT@194,"DO YOU NEED T
O REVIEW FILE      AND FILENAME
REQUIREMENTS       FOR EXECUTING
 THIS SCREEN       DUMP?   (Y/N)
  ";:RETURN
620 CLS:PRINT@66,"YOU SHOULD HAV
E READY ";W$(0):PRINT@98,"FILES
(SCREEN IMAGES) FOR        LOADIN
G.  THE IMAGES OF ONE      ";W$(1
);" OF FILES SHOULD CORRE-      S
POND TO THE TOP ";W$(2);" OF
      THE PRINTOUT. ";
630 PRINT"ANOTHER ";W$(1);"
 SHOULD CORRESPOND TO THE NEXT
 ";W$(2);" OF THE PRINTOUT, ETC.
":PRINT@453,M$;:RETURN
640 CLS:PRINT@34,"THE LAST 2 CHA
RACTERS OF EACH    FILENAME MUST
INDICATE WHERE     THE SCREEN IMA
GE IS TO BE        PRINTED.  FOR
EXAMPLE, L1";W$(3);"   AND R1 EN
DING THE FILENAMES":RETURN
650 DATA 2,27,49,0,0,0,0,0
660 DATA 3,27,108,9,0,0,0,0
670 DATA 5,27,42,1,0,3,0,0,0,0
680 DATA 2,27,50,0,0,0,0,0
```

Listing 3: LALTER

```
240 IFK$="O" OR K$="o"THENCLS:PR
INT@196,"1: HI C SCREEN DUMP":PR
INT"     2: SAVE SCREEN ON DISK":
PRINT"     3: DIR":GOTO645
330 INPUT#1,D,S:CLOSE#1:IFD>7 AN
D D<11THEND=11ELSEIFD>11 AND D<1
5THEND=15ELSEIFD>15THEND=23
645 K$=INKEY$:IFK$=""THEN645ELSE
IFK$="1"THENRUN"DRIVERLT"ELSEIFK
$="2"THENGOSUB15:GOTO200ELSEIFK$
="3"THENCLS:DIR:PRINT"     PRESS
SPACE TO CONTINUE"ELSESOUND60,10
:GOTO200
646 K$=INKEY$:IFK$=""THEN646ELSE
200
```

Listing 4: LALTERD

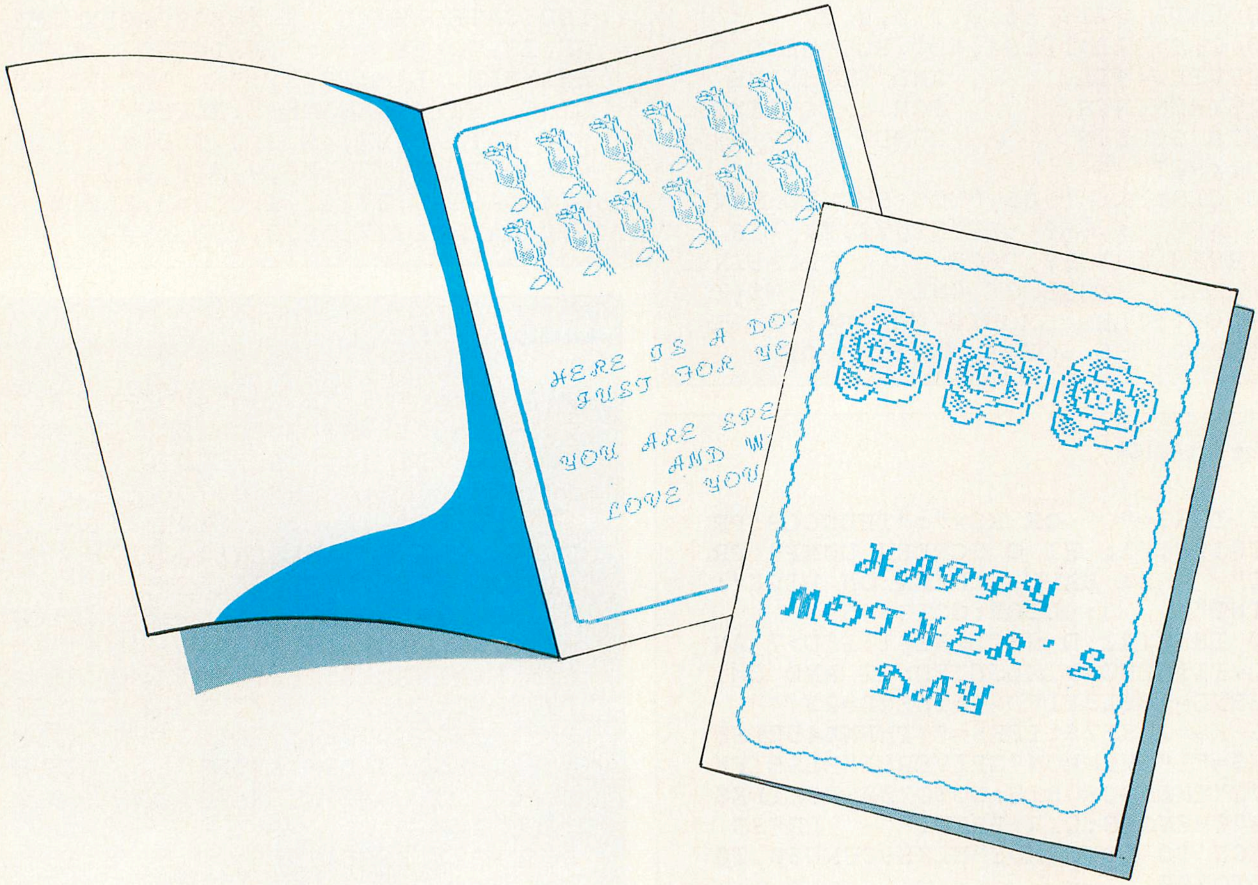
```
240 IFK$="O" OR K$="o"THENCLS:PR
INT@196,"1: SCREEN DUMP":PRINT"
   2: SAVE SCREEN ON DISK":PRINT
"     3: HI C SCREEN DUMP":PRINT"
     4: DIR":GOTO645
330 INPUT#1,D,S:CLOSE#1:IFD>7 AN
D D<11THEND=11ELSEIFD>11 AND D<1
5THEND=15ELSEIFD>15THEND=23
645 K$=INKEY$:IFK$=""THEN645ELSE
IFK$="3"THENRUN"DRIVERLT"ELSEIFK
$="1"THEN650ELSEIFK$="2"THENGOSU
B15:GOTO200ELSEIFK$="4"THENCLS:D
IR:PRINT"     PRESS SPACE TO CONT
INUE"ELSESOUND60,10:GOTO200
646 K$=INKEY$:IFK$=""THEN646ELSE
200
```

Listing 5: LALTERE

```
240 IFK$="O" OR K$="o"THENCLS:PR
INT@196,"1: HI C SCREEN DUMP":PR
INT"     2: SAVE SCREEN ON DISK":
PRINT"     3: DIR":GOTO645
330 INPUT#1,D,S:CLOSE#1:IFD>7 AN
D D<11THEND=11ELSEIFD>11 AND D<1
5THEND=15ELSEIFD>15THEND=23
331 D=SF*D:S=SF*S:M(0)=SF*(D(CD)
+2)-2
645 K$=INKEY$:IFK$=""THEN645ELSE
IFK$="1"THENRUN"DRIVERLT"ELSEIFK
$="2"THENGOSUB15:GOTO200ELSEIFK$
="3"THENCLS:DIR:PRINT"     PRESS
SPACE TO CONTINUE"ELSESOUND60,10
:GOTO200
646 K$=INKEY$:IFK$=""THEN646ELSE
200
```

Listing 6: LALTERDE

```
240 IFK$="O" OR K$="o"THENCLS:PR
INT@196,"1: SCREEN DUMP":PRINT"
   2: SAVE SCREEN ON DISK":PRINT
"     3: HI C SCREEN DUMP":PRINT"
     4: DIR":GOTO645
330 INPUT#1,D,S:CLOSE#1:IFD>7 AN
D D<11THEND=11ELSEIFD>11 AND D<1
5THEND=15ELSEIFD>15THEND=23
331 D=SF*D:S=SF*S:M(0)=SF*(D(CD)
+2)-2
645 K$=INKEY$:IFK$=""THEN645ELSE
IFK$="3"THENRUN"DRIVERLT"ELSEIFK
$="1"THEN650ELSEIFK$="2"THENGOSU
B15:GOTO200ELSEIFK$="4"THENCLS:D
IR:PRINT"     PRESS SPACE TO CONT
INUE"ELSESOUND60,10:GOTO200
646 K$=INKEY$:IFK$=""THEN646ELSE
200
```



Software CoCo 1, 2 & 3

CoCo Graphics Designer Plus— Signs of the Times

Every Tuesday is "Computer Day" at my young son's school, and he regularly brings home output from the day's session at the keyboard. Not too many Tuesdays ago, I walked into his room after work to find a prominent addition to his decor: a computer-generated banner hanging on the wall, proudly announcing "JASON LOVES MOMMY." A bit-image teddy bear rounded out the proclamation, apparently serving as the necessary link between human sentiment and hi-tech wizardry. My wife, who helps out at the school regularly, assured me that Jason had come up with the text of his banner without any maternal coaching. Obviously pleased with the day's lesson, though, she wondered aloud why we didn't have such a program for our computer.

I'm happy to report that there is a delightful program available for the CoCo that does banners and much more. *CoCo Graphics Designer Plus*, from Zebra Systems, Inc., provides the capability for producing banners, signs and greeting cards via an elegant point-and-click interface.

This program runs on any Color Computer with at least 64K of memory. Yes, that is correct: any Color Computer 1, 2 or 3. When I read the system requirements page in the manual, I was amazed to see that the program could also run on my old silver 64K CoCo 1 as well as my CoCo 3. It worked perfectly.

Upon running *CoCo Graphics Designer Plus*, the user arrives at the main menu, which is clear and simple (as main menus should be). Your choices are Make Sign, Make Banner, Make Card, Set Up Printer and Set Up Data Drives.

A selection is made from among these by directing an onscreen arrow with either a joystick or mouse, and then clicking the button. If you have never used this type of interface before, you needn't worry: After working with it for 15 seconds you'll know everything you need.

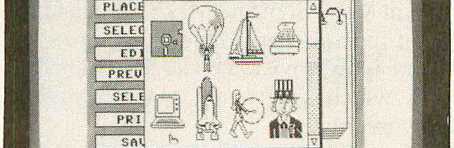
Selecting Set Up Printer allows you to configure your program disk for the type of printer you have and the baud rate you are using. This needs to be done only once (assuming you don't change printers or baud rates). The array of printers supported by *CoCo Graphics Designer Plus* is nothing short of astounding. The list would never fit on a single screen; it is accessed by scrolling through a window and clicking on the appropriate printer.

Having established that bit of trivia, the other setup command enables you to specify which disk drives you will use to hold collections of pictures, fonts (a font is a particular way of shaping letters and numbers) and border patterns. If you have only one disk drive, you can completely skip this step, and the program will assume all of the above will be stored on Drive 0. The program disk as purchased has six different fonts, a collection of 32 pictures and 16 font borders, all of which fit on the program disk. However, the company sells additional disks of fonts, pictures and borders.

Once the setup procedures are taken care of, you can proceed to any of the three creative functions. Make Sign enables you to create a one-page (8½-by-11-inch) sign, consisting of a combination of up to 14 lines of text, up to two pictures and an optional border. For this function, the screen is oriented around two activities. The right side of the screen displays the current border and the pictures being used for the sign. The left side of the screen contains menu items (or "buttons"), which can be clicked on to do specific actions.

Buttons on the Make Sign screen include Select Picture, Place Picture, Select Border, Edit Text and Preview Sign. Each of these leads to an additional screen display. Also, there are buttons for Print Sign, Save Sign and Load Sign.

Select Picture asks which of the allowed two pictures you are selecting (Number 1 or 2), and which set of pictures you want to select it from. (Unless you purchase additional picture disks, there is only one set. See the sidebar "Clip Art for Your Creations" for more information on the picture disks.) It then loads the picture set and allows you to scroll through it and click on the picture you want.



Once you have selected a picture, you can place it on the sign using Place Picture. You have a choice of small, medium or large pictures on the sign, although choosing large limits you to one nearly full-page picture. If you select small or medium, you can use both of the allowable two pictures, but both must be the same size.

The Place Picture function displays a three-by-three grid for medium-sized pictures, or a six-by-six grid for small pictures. By clicking on a grid location, you can place or erase either of the two pictures at that location. You also have buttons for filling the whole grid with one picture, staggering them in every other location or clearing the entire sign.

In addition to pictures, a sign can have one of 16 borders around the edge. (Many more borders are available on the optional border disk.) The Select Border function enables you to specify which collection of borders you want to select from, loads that collection, and lets you scroll through them and select.

Select Picture, Place Picture and Select Border are all implemented very smoothly, and the commands and buttons function intuitively. The pictures and borders are shown onscreen as you select and place them, which is a major improvement over many programs of this type, which merely name them, without letting you see what they look like until print time.

The next function for making a sign is Edit Text. The implementation here is not quite as smooth as the picture and border functions, although my outlook may be biased by my extensive use over the last few years of several point-and-click word processing programs. *CoCo Graphics Designer Plus* is not intended to be a word processor, and thus only the most basic capability is provided within the Edit Text option.

Text editing is done in a 14-line window on the right side of the screen; buttons on the left side allow you to specify posi-

In the Zebra Zone

When the CoCo 3 was released, there was a sudden flurry of activity among Color Computer enthusiasts. It was quite interesting to watch. Photocopied technical manuals were in hot demand, hardware hackers were dissecting circuit boards, and software developers were scrambling to crank out products that would take advantage of all the new features. It's only natural, of course, to want to investigate the new and exciting.

For satisfied CoCo 2 owners, however, there was understandable concern over the fate of their faithful machine. Would anyone continue to develop new products capable of running on the CoCo 2?

The answer, fortunately, is an unqualified "Yes!" and Zebra Systems, Inc., is one such company. The philosophy at Zebra Systems, according to founder Stewart Newfeld, is not to write for the most powerful machine, but to take popular concepts and make them available in a quality package to the entire CoCo Community.

"We feel we can introduce half a dozen products a year which will not require an upgrade to the CoCo 3," said Newfeld. "We will continue to support the CoCo 2."

Incorporated in February 1983, Zebra Systems has a history of providing high-end capability to computers on the low end of the price scale. Their original product line boasted a 48-page catalog, including joysticks, light pens and voice synthesizers, all for the Timex Sinclair.

As the Sinclair market dwindled, the company probed the IBM software market but found it difficult to get distribution. Retrenching, Newfeld investigated many microcomputers before settling on the Color Computer. Zebra Systems remains in the surplus market, as well, buying peripheral devices in bulk and adapting them to run on various computers. It even has an inventory of Timex Sinclair kits, sold primarily to schools for training in soldering skills and basic electronics.

Zebra Systems uses a variety of micros in its business and has seen many changes in the personal computer market over the years. "People's expectations have changed," Newfeld explained. "A light pen today has to be really extraordinary or people don't have much interest in it." The interaction between man and machine has changed, too, and the current trend is toward easy-to-use, point-and-click graphic interfaces. The original *CoCo Graphics Designer*, released several years ago, was entirely keyboard-driven. It took Newfeld and programmer Jeff Street over a year to rewrite it to provide the type of interface and flexibility users are growing to expect.

The key to making future graphic interfaces more responsive, says Newfeld, with his electrical engineering background, is "supporting a precision mouse and generating sound without slowing down the CoCo." To that end, he is working on a CoCo peripheral that contains its own microprocessor, and is tentatively dubbed the Turbo-Port.

"We want the CoCo 2 to really sing," he says. If *CoCo Graphics Designer Plus* is any indication, the music has already begun. ☐

Clip Art for Your Creations

I am one of those people with absolutely no artistic talent whatsoever. You know the type — can't draw a straight line with a ruler. I was absolutely delighted, therefore, when graphics editors began proliferating. With a good graphics program, I can not only draw straight lines, but squares, circles and all sorts of things that always eluded me in the past.

For a time I was elated. Eventually, though, it became apparent that I still had a problem. Although I could now draw the basic shapes, putting them all together into something that looked like more than just a jumble of shapes was *still* beyond me.

Clip art to the rescue! Clip art enables a non-artist such as myself (or anyone else, for that matter) to take advantage of pictures already created by someone who really knows how to draw.

Zebra Systems offers three different picture disks (sold separately), each containing four collections of pictures. The pictures are stored on disk in a format compatible with Zebra's *CoCo Graphics Designer* program.

Now, it certainly makes sense for a company to sell a product that's compatible with other of its offerings; and it is not surprising that Zebra has included a simple conversion program that enables you to convert the pictures for use with another Zebra product — *CoCo Graphics Designer Plus*. However, Zebra has also included conversion programs to make the pictures compatible with Colorware's *CoCo Max*, *CoCo Max II*, *CoCo Max III* and *Max-10* programs.

All of the conversion programs are extremely easy to use and are well-documented in the manual and onscreen. The conversion programs write the converted pictures to a new disk; Zebra includes preprinted disk labels, which are immensely helpful in keeping track of your clip art collection.

Each *Picture Disk* contains collections of pictures in four categories. Each collection has 32 pictures in it, for a total of 128 pictures per disk.

Picture Disk 2 (*Picture Disk 1* has been discontinued) includes "Sports," "America," "Party" and "Office" collections. The wide variety includes athletes and sports equipment; patriotic symbols, cowboys, Native Americans and space vehicles; wedding cakes, balloons and party hats; and pencils, phones and paper clips.

Picture Disk 3 contains "Religion," "Animals," "Nature" and "Travel" categories. You can choose from an amazing array of religious artifacts, clergymen and buildings; animals from frogs to rhinos, cows to vultures; nuts, trees, sunsets and flowers; ships, campfires, trains, planes and automobiles.

Picture Disk 4 is a holiday disk. Collection 1 is filled with scenes of Christmas, including Santa, reindeer, snowmen, Wise Men and elves. Collection 2 covers Jewish holidays, with pictures of menorahs, latke, torah and the Star of David. Collection 3 covers Easter, Thanksgiving, St. Patrick's Day and Valentine's Day. Collection 4 has pictures for New Year's Day, Independence Day, Halloween and parades.

All of the pictures were created by professional graphic artists, and are remarkably detailed yet simple and elegant. The assortment of pictures is sure to provide for every taste — even if your favorite animal isn't there, your second or third choice almost certainly will be!

I used a variety of pictures from the disks with *CoCo Graphics Designer Plus*, *CoCo Max III* and *Max-10*. The conversion programs gave me no trouble at all, and the labels provided with the picture disks kept me from getting disorganized. Once converted, the pictures can be pulled into any of those programs with incredible ease. The documentation includes sections on each of the programs the pictures can be used with, explaining precisely how to import the pictures into each program. Also included in the manual with each disk is a reference sheet that illustrates the pictures in each collection.

I have only two minor complaints with Zebra's *Picture Disks*. First, the reference sheets illustrate only 30 pictures in each collection. It was quite by accident that I discovered that there are actually 32. I don't know if this was intentional, or if the additional pictures were an afterthought, subsequent to the completion of the documentation. It certainly doesn't hurt anything, but I have a tendency to get nervous when write-ups don't accurately reflect reality.

My other minor gripe is that the conversion programs require disk swapping, even if you have two disk drives, as I do. I realize I can't expect much sympathy for this one, but I do find it annoying.

Regardless of whether you are a total non-artist as I am, or an accomplished graphics designer, if you own any of the supported graphics programs you should consider purchasing one or more of these clip art collections. They represent high-quality work at an excellent price.

☐

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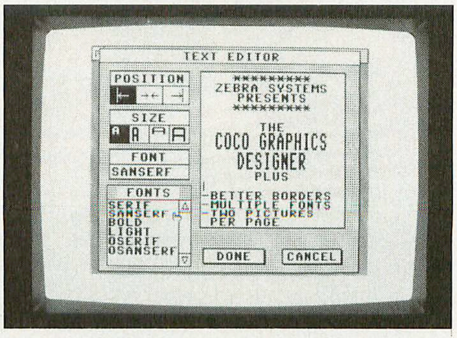
tioning (left, right or centered), size (one of four) and font (any from the designated collection) for each line of text. It takes a bit of practice to feel comfortable with this editor, but all you're editing are 14 lines, so it is not a major problem.

The Preview Sign function enables you to see, either actual size or reduced, precisely what your finished product will look like when printed. This can save lots of time and paper if you haven't properly aligned the text and pictures, or if the desired effect isn't what materialized.

The Print, Save and Load functions are totally straightforward. The only drawback is that the Save must be made to Drive 0. No provision was made in the Set Up Data Drives function at the main menu for specifying which drive should hold your finished product. This is rather annoying, since the program disk must reside in Drive 0 and it is very close to being full when you get it. There isn't room for much more, so you have to resort to swapping disks. I always get snippy when I am forced to swap disks after I spent good money on a second disk drive specifically to avoid swapping!



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****

THE
COCO GRAPHICS
DESIGNER
PLUS

-BETTER BORDERS
-MULTIPLE FONTS
-TWO PICTURES
PER PAGE

The Make Card function works almost identically to Make Sign. The basic difference is that you create two different pages — one for the front of the card and one for the inside. There is an additional button, Select Page, that allows you to toggle between the two while preparing the end result. When printing a card, the first page is printed upside-down in the upper-left quarter of the paper, and the second page is printed normally in the bottom right quarter. By folding the paper in half twice, a 4¼-by-5½ inch card is produced.

The Make Banner function is considerably simpler than the other two. The available buttons are Select Picture, Edit Text and Print. You can have one leading picture and another picture to follow the text. The Edit Text function is identical to that in Make Sign and Make Card, and the Print function has no hidden complexity. There is no provision for saving banners to disk, which is reasonable since they are so easy to create.

I made a number of signs, cards and banners with *CoCo Graphics Designer Plus* and was thrilled with them all. I was also fortunate to be able to try the additional font, picture and border disks. The variety is awesome, and programs are included that will convert the pictures to *CoCo Max I*, *II*, *III* and *Max-10* formats.

CoCo Graphics Designer Plus comes with a 63-page users manual, which includes extensive appendices, a thorough tutorial and a quick reference guide. It is clear, easy to follow and complete. It is also lavishly illustrated with sample screens and contains a glossary that defines terms such as "point" and "click."

CoCo Graphics Designer Plus is a top-notch program. The graphics are superb; the documentation excellent; the user interface simple, easy to use and efficient; and the price makes it a steal. I thoroughly despise reviews that end with "Your software library won't be complete without it," but this really is one program that everyone can use.

(Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421, 718-296-2385; $29.95 plus $3 S/H; picture disks available at $14.95 each)

—Jim Issel

Software

CoCo 1, 2 & 3

Math Tutor— Math Practice and Educational Arcade Action

Why should students give their teachers *Apples* when they can give them a CoCo and some educational software to go along with it? Tandy's new educational program on a ROM pack, *Math Tutor*, is not only great for home use but could also enhance an elementary math class.

I happen to be a serious person and like to see computers used for serious purposes. Education ranks high with me as a reason for purchasing and using a computer. Unfortunately, it ranks low with my children. It's hard to tear them away from the excitement of *Color Baseball* and the shoot-'em-up action of games like *Space Assault* in order to play some mundane educational game.

I'm not of the opinion that all education should be tremendously exciting, but when made exciting learning becomes that much easier. Most educational math programs tend to be monotonous: The user is presented with a math problem; he gives the answer; the computer rewards him with a cheer or a raspberry; the user moves on to the next question. The programmers of *Math Tutor* have pretty much stuck to this formula, but they have added something more exciting called The Math Gallery.

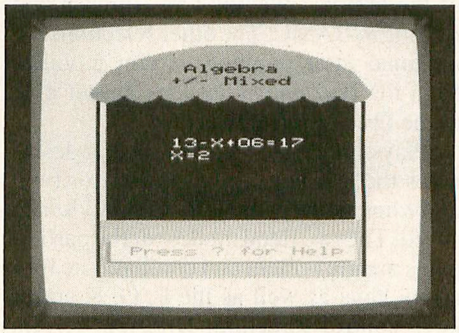
The Math Gallery combines the action of a video game with an educational drill. The player stands at a shooting gallery in the midway of a carnival. A balloon travels across the top of a booth while a math problem is presented. At the bottom of the screen, the player has a gun that follows the movement of the balloon. If the player answers the question correctly before the balloon reaches the other side of the screen, the gun fires and the balloon pops. While the game is going on, carnival music plays in the background. If you haven't been to a fair or carnival in years, the music is guaranteed to bring on nostalgia.

Math Tutor not only covers addition, subtraction, multiplication and division, but it also covers fractions and algebra, thus making it more extensive than other math programs I've seen. In all of the areas, with the exception of algebra, the user has the option of choosing comparison problems. These problems require the user to determine if two whole numbers or fractions are less than, greater than or equal to each other.

There is no multiplication or division in either of the fraction or algebra problems. However, in order to make the algebra problems more difficult, you can choose problems that mix addition and subtraction.

Within *Math Tutor* you can get help in two ways. If you are absolutely stumped on a problem you can press the ? key and the answer will be given to you. There is also a built-in scratch pad; you can access this at any time by pressing the S key. This is especially useful if you are doing difficult problems that involve carrying or more than one operation.

There are five levels of play. The higher levels increase the range of numbers and include negative numbers. In the higher levels of division, the answers may have remainders; and in the higher levels of fractions, the fractions may have different denominators. Things can be made even more difficult in the shooting gallery by increasing the speed at which the balloon travels across the screen.



```
Algebra
+/- Mixed

13-X+06=17
X=2

Press ? for Help
```

The user not only has control over the levels of difficulty but can set the lesson size to 10, 20, 30, 40 or 50 problems. You can also choose to have the problems presented in either a vertical or a horizontal

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format. If you want you can choose both: Some of the problems will appear in a horizontal format and some in a vertical format. At the end of each lesson, you can decide whether to repeat the lesson, repeat your errors only or go on to the Math Gallery.

Math Tutor is very easy to use. I was able to run most of the program without using the manual. When I did have to consult the manual, I found it very easy to understand. For those who have used other programs licensed by ZCT Systems to Tandy, *Math Tutor* will be even easier because it uses menus and formats that you have used in other programs. For example, the BREAK key always takes you back to the last step.

An additional feature of *Math Tutor* is the homework option. This is especially useful for parents or teachers who want their child or student to concentrate on certain problems. The adult can create a homework assignment and then save it to tape for future use. I only wish it were possible to print out the homework assignments.

Other than the lack of a printer option, *Math Tutor* is a fairly complete program, and I have few complaints with it. All single-digit numbers have leading zeros, which may confuse children at first, but my boys quickly adapted to it. One of my sons wished that the program could time him on his math problems and give the percentage of correctly answered problems at the end of each lesson. Following the Math Gallery you are given the percentage of correct answers given for questions asked in the Gallery, but you are not given percentages on the questions answered in your regular lesson. One other problem is that there are no answers greater than 99. This means that there is no three- or four-column math, which my kids are already doing in school. However, this doesn't mean that *Math Tutor* is easy. Try the Math Gallery in Level 5; I guarantee that you won't pop too many balloons — especially if you have chosen the high-speed option.

On a scale of 1 to 10, one son rated this program a 10, while my wife, my other son and I each gave it a 9. If you have elementary school-age children and a CoCo with at least 16K of RAM (a cassette recorder is optional), then you should consider purchasing *Math Tutor*.

(ZCT Systems, dist. by Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $24.95: Available in Radio Shack stores nationwide.)

—Dan Weaver

Software CoCo 3

Orc Ambush— A Fight to the Death

Visit a bookstore and you'll probably find a section devoted to novels about heroes and heroines battling for good in a land of sorcery. On other shelves you might find role-playing games that let players experience such adventures first-hand. Through the magic of computers, the pads of paper, charts and dice needed to play these games have been eliminated.

SPORTSware, makers of *Wargame Designer*, also produce many different scenarios to complement their program. One of these is *Orc Ambush*, a wargame set in the Forest of Lynn, home of evil Orcs, good humans and elves. The goal is to conquer the Orcs, who have stolen the chest of herbs belonging to the wizard Shanndar. Exiting the forest, crossing the river, entering the fort and defeating the Orcs are a few of the many challenges to surmount in this game. The program does not require the *Wargame Designer* to run, as *Orc Ambush* is self-contained. However, those who own *Wargame Designer* or *Wargame Designer II* can modify all of the existing characteristics of this scenario.

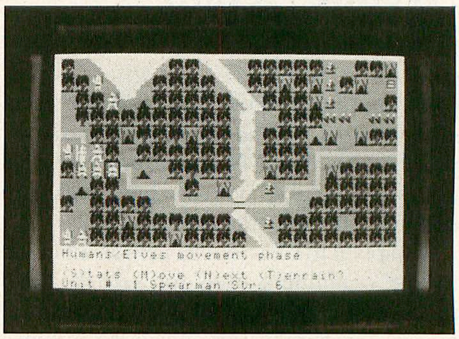
Orc Ambush requires a CoCo 3 and one disk drive. Like numerous high-resolution graphics-oriented programs for the CoCo 3, an RGB monitor is required to enjoy *Orc Ambush* to the fullest. Many different modules for various portions of the game are loaded separately from disk. As no copy protection is employed, making a backup copy of the original is a must.

Loading the program is simple, requiring the user only to type `RUN"M"`. The main menu then appears with six available choices. If you don't own *Wargame Designer*, you will be able to invoke only two of the options: Playing Orc Ambush and Exiting to BASIC. The other selections are obtained after copying certain modules from the *Wargame Designer* master disk to the *Orc Ambush* disk.

Play commences after the player designates the number of players (one or two) and whether the game is new or previously saved. The two main modes for the participants are movement and combat. The four arrow keys as well as the P, O, K and L keys control direction. Different terrain squares have varying movement costs. Each character in the scenario has a certain range of movement and attack. This attack is not necessarily successful and, as in real battle, conditions can hurt the cause instead of helping. Each turn ends after the attack damage has been calculated for each piece. If a unit does not attack for two turns, a "resting " message flashes on the screen, and the strength counter increases in value for that character.

The Orcs are normally invisible in the one-player mode, but pressing SHIFT-3 during the human attack mode will put the green and black monsters on the screen. The first few times you play, you'll find this mode very helpful in preventing an embarrassing defeat. Selecting a two-player game allows only one side's fighters to be displayed at a time, with the other player knowing the location but not the identity of each character. The manual states that *Orc Ambush* was designed to be a one-player game. Novices may find it more fun to play against a person of similar skill, for the computer is a challenging opponent.

Game play ends when either side has all of its units destroyed, the human side occupies the treasure chest, or the player presses Q to quit playing. The goal is to occupy the representation of the treasure chest in the upper-right corner of the screen. Killing all the Orcs is next to impossible, and this kind of victory will take much more time than usual. At any rate, destroying the monsters is not the way to run a successful war.



```
Humans/Elves movement phase
(S)tats (M)ove (N)ext (T)errain?
Unit # 1 Spearman Str. 6
```

Even expert gamers will find that the computer-controlled Orcs can be very tricky, so don't count on winning until after you've had some practice. The game save feature is a necessity because one full game can run into many hours (depending on your skill).

The manual to *Orc Ambush* is relatively short and requires only a brief amount of study to understand. Hints and tips are provided, although only experience will allow the player to determine the best strategies for victory. Also included is a step-by-step process allowing *Wargame Designer* to modify the maps, characters and graphics.

At $15, *Orc Ambush* is inexpensive for a stand-alone game with such attention to detail. The RGB graphics are very good, with a fair amount of detail and razor sharpness. The composite screen, on the

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Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

other hand, does not do justice to the game. My only complaints are with the speed in loading and operation. It seems to take forever for your turn to come up.

SPORTSware deserves congratulations for filling a demand in the CoCo Community. *Orc Ambush* is a program that will provide many hours of entertainment, and it won't catch dust on the shelf.

(SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, 419-389-1515; $15)

—Fred A. Miller

Software

CoCo 1, 2 & 3

Revenge of the Germs— What Your Mother Never Told You!

Do you remember your mother telling you to wash your hands, leave the candy on the sidewalk, and to wipe your nose on a tissue, not your sleeve, so you wouldn't "get germs"? And didn't you think that germs spread by sort of cloning themselves? And I bet you thought germs were little microscopic things, right?

Revenge of the Germs is a graphics Adventure game (although when I saw the title I figured it for an arcade game or anti-virus program for sure) that will change how you look at germs from now on.

After my precautionary backup, I booted the game. I got to the part where it asked "Read the objective?" (the background info on the game) and got stuck. I pushed every key on the keyboard and got no response. Hmmmm. OK, I can't review a game I can't get into, can I? I sent off a note to the author, who called me with the fix, and he promised to fix his master copies also. I found this author to be like most, willing to go the extra mile with support. Now, onto the game!

I seem to be in a hospital bed. I can see my feet sticking out, anyway. What in Sam Hill happened? The door to my room is trashed. Guess I'd better get up and see what happened here.

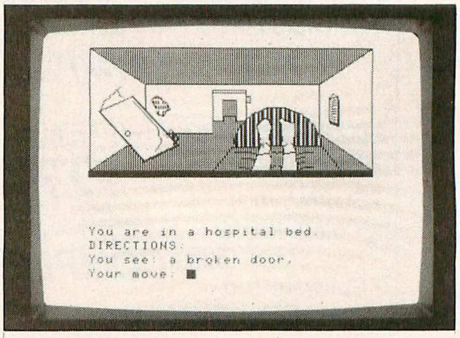
Wandering through the hospital, I didn't find anybody around and the doors were locked. What I *did* find was this gigantic blob, with hands, feet and head. *That*'s a germ, and it's too big to fit through the door, but it seems to keep finding me — usually if I happen to stay in a room too long. It's definitely out to get me. The germ is a random feature, and, oh yes, it can kill you! I have to get out of here, but I have to kill some of them on my way. (Trust me! Hitting them does not work!)

The graphics are well done, with detail. The objects disappear as you take them and reappear if you drop them. This hospital comes complete with lobby, lab, waiting room and operating room, along with some rooms a hospital patient normally doesn't see. Did I mention that the elevator disappears as soon as you step off?

The game accepts most standard commands, except for the `USE` and `HELP` commands. It also incorporates a few words that weren't in my first-grade reading book. Since you won't be able to finish this game in one sitting, you'll be able to use the `SAVE` and `LOAD` features that are included.

When I play Adventure games, I have this habit of picking up every object I can, and I absolutely hate to drop anything because you never know if you're going to need it later. This game accommodates my habit. You should see how much stuff you can carry! And for those who don't know which way is north, the directions in this game are left, right, forward and back. The only thing I really found lacking in it was a `SCORE` command. I like to gauge my progress by the points I have accumulated. For those of you who like to be surprised, the lack of a score won't bother you.

Included with *Revenge of the Germs* are three pages of very complete instructions. The instructions cover startup of the game, making backups, sample text, and the conditional guarantee from The Software Systems. It's recommended for ages 10 and up, and I suspect that's because it requires some logical thought and creativity to solve. If you happen to get stuck while playing the game, just grab a couple of friends or family members. You'll get plenty of suggestions.



```
You are in a hospital bed.
DIRECTIONS:
You see: a broken door.
Your move: ■
```

Revenge of the Germs will work on your Color Computer 1, 2 or 3. A single disk drive is also required. The game fits on one disk, so there is no disk-swapping. If your original disk doesn't work for some reason, send it with $1 for handling charges back to The Software Systems for a replacement.

I really enjoyed this game. I'm a sucker for graphics, and I always get anxious to see "the next scene." This game didn't disappoint me in that respect. Once I remembered a few basic rules about adventuring, I was able to solve it. At $9.95, it's a real bargain, affordable even on a paper carrier's salary. Also, while you're killing germs, you'll be saving not only yourself but also *real* beasties, because 25 percent of all profits from the game will be donated to the Nature Conservancy. I commend the author for this concern. And his donations.

(The Software Systems, 5576 Oak Vista Drive, Cincinnati, OH 45227, 513-561-1272; $9.95: First product review for this company appearing in THE RAINBOW.)

—Gail Allore

Software CoCo 3

Printer Drivers for Home Publisher— More Support for the OS-9 Desktop Publisher

Did you buy the *Home Publisher* OS-9 desktop publishing program from Radio Shack only to find that you would have to purchase a new printer just to get a hard copy of your efforts — Tandy did not provide drivers for many of its own printers. And isn't that the whole point of desktop publishing — making printouts?

Fortunately, Tandy later provided drivers for the DMP printers free for the asking to registered *Home Publisher* users.

I loved *Home Publisher* so much that I went out and bought a new Star NX1000 Rainbow color printer, which *was* compatible. Having purchased three printers over the years from Radio Shack, I too was disappointed that *Home Publisher* did not support the CGP-220 color printer. Well, wish no more, for *Home Publisher* has new drivers for seven popular printers. Please note that the disk of add-on drivers is an Express Order item and may not be stocked by your local Radio Shack store. (Also, note that *Home Publisher* is for the CoCo 3 with a disk drive and a compatible printer.)

While I have only one printer supported by this package of printer drivers, I will note for you the special considerations you should be aware of from the instructions included. Although the documentation is only three pages of information, it seems to be complete and all that is needed. The *Home Publisher* add-on diskette includes drivers for these printers: Tandy CGP-220 and DMP-110, C.Itoh 8510, Epson MX-80, Okidata 20, Panasonic KX-P1090 and Star SG-10.

The instructions indicate that no special considerations need to be made for the C.Itoh 8510, Okidata 20 and the Panasonic KX-P1090. If you are using the Epson MX-80, the printout will be only 5¼ inches wide. The reason for the narrow printout is the 960-dot line of this printer. For the Star SG-10, DIP switch settings are noted.

Two drivers are included for the DMP-110 because a full-screen printout is 1 inch longer than will fit on standard paper. *DMP-110N* is the full-screen version, and several options are available to you. You could have it overlap two pages of standard paper, use continuous paper or load your printer with a sheet of 14-inch paper to avoid using two sheets. The second driver for the DMP-110 is the *DMP-110S*, which will truncate the bottom 10 percent of the page so that it will fit entirely on a single page of standard paper.

The only special consideration for the CGP-220 is that *if* you want to use the printed borders you should set the left and right margins to .09. This allows eight dots plus one blank dot for the border pattern on each side. If you think I saved the best for last, you are right! If you read the first line of info for the CGP-220 where it says "will only print in black and white," don't believe it! If you want the page to print in other than black, even in multi-color — you can!

How to Get Color on the CGP-220

To print in a color other than black, just send the color commands to the printer using the OS-9 `display` command (yes, it is in there and available for you to use) *before* starting *Home Publisher* for printing; the software will not reset the printer to black.

To print the page using green, enter `display 1B 54 32 >/P` from the OS-9 prompt and press ENTER. Then start up *Home Publisher* as usual. When you print the page it will be printed in green and white. To print in another color just change the `32` in the `display` command to the Hex value of the color you want. For a multi-color page you will have to do a little more work and planning.

If you only want the border a different color, this is how it's done. First, set the printer with the border color from OS-9 using the `display` command. Next, print a blank page from *Home Publisher*, selecting the desired border pattern. Then exit to OS-9 and set the color for the rest of the document. Bring up *Home Publisher* again, then load/create the page; reset the paper

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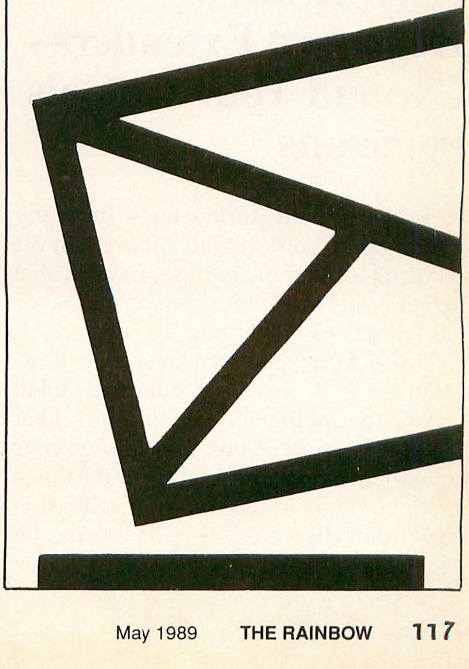

in the printer back to the top of the page before printing the second color.

The easiest way for me to realign the paper for the second color was to tear the roll paper off even with the tear bar on the printer. When I said multi-color that's just what I meant!

To print a page in more colors you would create a separate page for *each* color, saving each of them in a separate file. To print the page you have to set the print color from OS-9, restart *Home Publisher*, and load and print the color, repeating this for each color until your masterpiece is done. It's a lot easier than it sounds — try it! If you have a color printer other than the CGP-220, you could do it the same way: just send the color commands for the printer you are using to get the same results (using the proper printer driver for the printer you are using). For those of you who do not have a color printer but have different color ribbons, you could merely change the ribbon for the printing of each color.

I hope this information will be of help to you even if you do not need the drivers on this disk. *Home Publisher* is a very good system made even better with this add-on set of printer drivers. Personally, I feel that users should not have to pay 20 bucks extra to get drivers that should have been in the original package. But it's nice that Tandy got around to providing them.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $19.95: Available in Radio Shack stores nationwide, Cat. No. 90-0911)

—J.D.Walker

Hardware

HAWKSoft's Keyboard Extender— Expand Your CoCo's Horizons

I'm extremely fortunate to have my CoCo on its own table. I have almost enough room for everything, and I'm able to type pretty much as my typing instructor in high school taught me.

I also know that not everyone is as fortunate as I am. Your computer table may be too small or cluttered. If it is, I bet that you've wished you could arrange your equipment more comfortably for the times when you type in those long BASIC listings from THE RAINBOW. There may be some hope for you.

HAWKSoft can provide you with a keyboard cable that allows you to remove the keyboard from the CoCo case and use it within a 5-foot radius. You could put the keyboard in your lap, or you could put it on the computer table, leaving the CoCo on the floor. Or you could try another arrangement. Of course, all this freedom comes at a price, and I don't mean money — you have to *open* your CoCo. The dreaded warranty seal needs to be violated!

Fortunately, the procedure to install the keyboard cable is fairly straightforward. If you are familiar with the operation of a screwdriver, you probably won't have too much trouble. And if you do, you can give the company a call. They were friendly when I called for a little advice. The single sheet of instructions was a little confusing. I talked to Chris Hawks of HAWKSoft and he assured me he would try to make them a little clearer, maybe even adding a diagram or two.

Opening the case is simple: Remove six screws from the bottom of the computer case (the sixth screw is *under* the warranty label, which means you have to poke a hole through it to get this screw out). After you lift the lid from the CoCo and its innards are exposed, you unplug the keyboard cable. Then you carefully insert the leading edge of the dual in-line plug into the keyboard connector. Stretch out the 5-foot extender cable and plug the keyboard into the card edge connector. Put everything back together on the CoCo and extend your reach.

If you are worried about damaging your keyboard, don't be. With a little care, the keyboard should last just as long out of the computer case as in it. Tandy enclosed it in a protective case. The cable itself is a flat ribbon cable that, with a little care, should last a long time. In fact, the whole keyboard cable assembly is made from industrial-grade parts. There is gold plating on the connectors, which means reliability. This cable can be used on any CoCo 2 or 3, and the sample I received was 5½ feet long.

A few things need to be considered before installing this product. Once the keyboard is removed from the CoCo, all its guts are exposed, and they are very fragile. The parts are especially sensitive to static electricity and loose paper clips, etc. It would be wise to cover the hole with something or to buy a spare keyboard to use with the extender cable. The mylar connector on the keyboard scratches easily, a fact that's mentioned in the manual but cannot be emphasized enough: You should be extremely careful not to damage this cable, or you will be buying yourself a new keyboard.

One complaint I have with HAWKSoft's Keyboard Extender is an unused row of pins on the plug that goes into the keyboard connector. This makes the plug sit at an angle on top of several other components near the connector. I think cutting off the unused row of pins would eliminate any potential problems. Another complaint I had was with the instructions, but Mr. Hawks assured me he will work on them. They were adequate for a hardware hacker, but I think they would have confused the neophyte. [Chris Hawkes reported that he has rewritten the instructions, and also that he has cut off the unused row of pins on the plug of his unsold cables.]

Should you buy this product? If you have a need to move your keyboard around, this well-made extender cable will do the job nicely for you.

(HAWKSoft, P.O. Box 7112, Elgin, IL 60121, 312-742-3084; $25)

—C.L. Pilipauskas

Book

BASIC Unravelled Series— Learning the Ropes

Imagine having complete control over the BASIC in your Color Computer, knowing the intricacies of its operation at every point as it runs your programs. Now imagine being able to change BASIC to work as *you* want it to, adding and improving commands as you desire, and being able to easily interface your own machine language routines with BASIC to perform special functions.

With the *BASIC Unravelled* series these things don't have to be limited to your imagination. *BASIC Unravelled* is a three-part series containing commented source code (assembly language code used to create machine language programs) of all of the ROMs in the Color Computers 1, 2 and 3. This is a disassembly of all the instructions the CoCo uses to operate Color BASIC, Extended Color BASIC and Super Extended BASIC. These disassemblies are extremely well-commented and include meaningful labels.

The three books in the series are 8½ by 11 inches, softbound and average 162 pages each. I was sent the newest versions of each of the books, and they look great. These latest publications contain some additional information not available in the older ones and have crisp tables and a typeface I really like.

The Rainbow Bookshelf

Fill out your CoCo library with these selections

The Complete Rainbow Guide to OS-9

Authors Dale Puckett and Peter Dibble show how to take advantage of OS-9's multitasking and multiuser features. An easy-to-read, step-by-step guide packed with hints, tips, tutorials and free software in the form of program listings.
Book $19.95, Disk Package $31 (2 disks, book not included)

The Complete Rainbow Guide to OS-9 Level II Vol. I: A Beginners Guide to Windows

Puckett and Dibble have done it again! They uncover the mysteries of the new windowing environment and demonstrate clever new applications. More hints, tips and plenty of program listings. Book $19.95, Disk $19.95

The Rainbow Introductory Guide to Statistics

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20 award-winning entries from THE RAINBOW's first Simulations contest. You are a Civil War Commander, an air traffic controller, a civil defense coordinator, or a scientist on Mars . . . your wits are on the line.
Book $9.95, Tape $9.95

The Second Rainbow Book of Simulations

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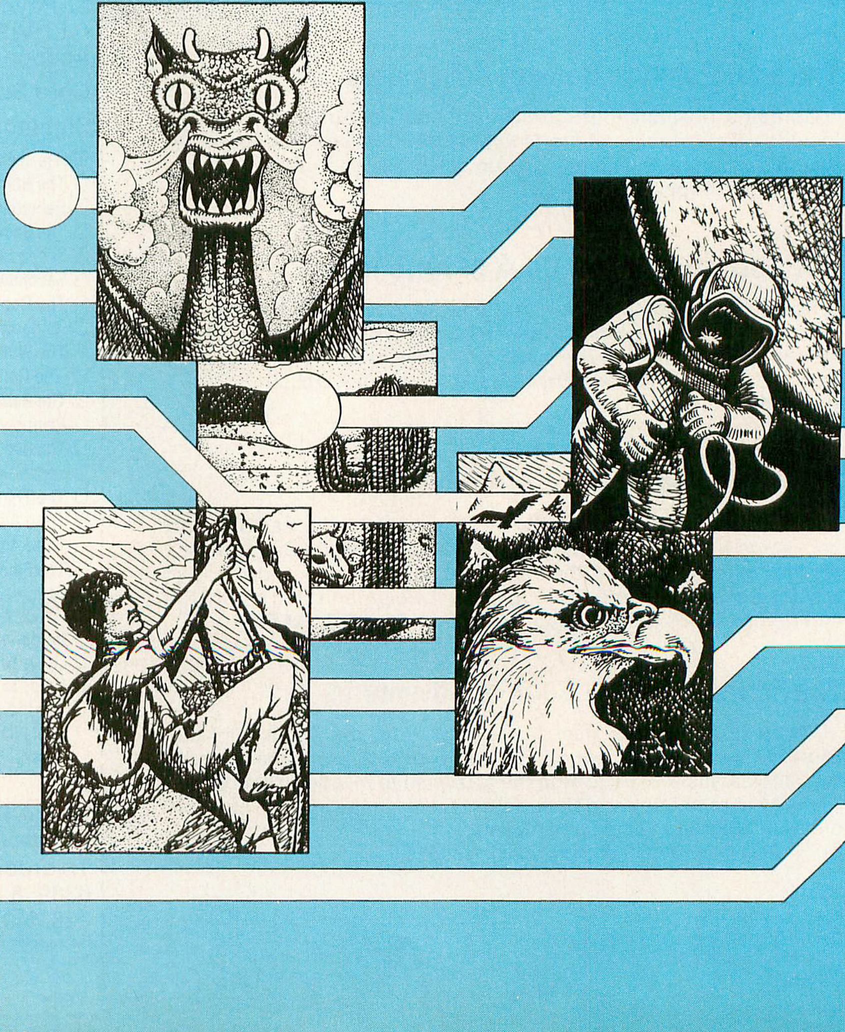

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Before I go any further, let me mention that these books are not for everyone. The best use of them can be made by someone who understands assembly language on the CoCo. I would recommend at least a general knowledge of assembly, but it isn't necessary for you to actually be a hard-core assembly language programmer. These books are not instruction manuals for programming, but rather are reference manuals. And they are extremely useful reference manuals.

Each of the books contains not only the disassemblies but also specific information dealing with certain features of BASIC that the particular book covers. The first book, *Extended Color BASIC Unravelled*, covers both Color BASIC and Extended Color BASIC (which were joined into one chip on the CoCo 3). It contains the source listings for both of those BASICs. Also covered are the various "Equates" and BASIC's direct page, interrupt vector tables, command interpretation tables, RAM vectors, and variables that BASIC uses. In the beginning of the book is a general description of how the BASIC interpreter works and how variables are stored. Several ROM routine entry points are listed, along with the registers that are affected by them. Also shown are the changes made to Color BASIC 1.2 and Extended BASIC 1.1 when the CoCo 3 powers up. Some things the new version doesn't have are the differences among Color BASIC 1.0, 1.1 and 1.2, and also the differences between Extended Color BASIC 1.0 and 1.1. Those with the older versions will find some anomalies in this new book.

The second book is *Disk BASIC Unravelled*. It covers Disk BASIC for all versions of the CoCo and even has separate disassemblies for Disk BASIC 1.0 and 1.1, making it much easier to follow them than to check a listing of the differences. This book also explains how the FCB (File Control Block) of Disk BASIC is set up, and it offers details of the FAT (File Allocation Table), the way the directory is organized, and on communication with the floppy disk controller. It also contains a listing of the direct page and variables.

The last book, *Super Extended BASIC Unravelled*, deals with the new BASIC of the CoCo 3. The disassembly in this book is especially well-communicated and was very understandable. Some of the additional information in this book deals with the hardware differences between the CoCo 3 and the earlier CoCos, the Memory Management Unit, super high-resolution graphics (including color generation and palette use), new CoCo 3 interrupts, and a chart showing the equivalent colors between composite and RGB monitors.

The possibilities these books present are almost limitless. Just by looking at the direct-page variables, you can see hundreds of peeks and pokes to monitor and alter BASIC. Knowing what BASIC is doing and when it is doing it can open all kinds of areas in your programs. When I was working on a remote terminal driver program (which is similar to `REMOTE2` but uses the RS 232 pack) for my BBS, I was able to incorporate many extremely useful features into it by referring to these books. Assembly language programmers have a huge source for information on how certain functions can be performed, and this programming information can be invaluable.

The books are available separately for $39.95, $19.95 and $24.95 for *Extended Color BASIC Unravelled*, *Disk BASIC Unravelled* and *Super Extended BASIC Unravelled*, respectively. Or, you can buy the first two for $49.95 or all three for $59.95.

These books have been called "definitive" by a well-known CoCo programmer. I say they are that and more.

(Microcom Software, 2900 Monroe Ave., Rochester, NY 14618, 716-383-8830; $59.95 for the set)

—Michael G. Toepke

Hardware

DS-69B Digisector—Capture Video Images

The Micro Works DS-69 Digisector was first introduced in 1984, making it one of the first video digitizers to become available for the Color Computer. In the nearly five years that the Digisector has been on the market it has been updated twice, first to the DS-69A and then to the current DS-69B; the software has been updated several times, and is now at Version 3.3 — Micro Works calls it III.III! By any standard, the Digisector is still holding its end up and remains one of the best choices in its field.

The Digisector itself is a cartridge that goes in one slot of the Multi-Pak Interface or a PBJ C-C Bus. The only control is for width; all other adjustments are handled by the *C-See* software. The video input takes the signals put out by TV cameras (black-and-white or color, including most camcorders), VCRs, videodisc players and other video sources. There is a filter to remove the color "subcarrier" signal so that it won't interfere with the digitizer's operation.

Once you've run the setup program to specify your system (a CoCo 1, 2 or 3 can be used), printer and expansion bus, you just `RUN"C-SEE"` to start the program. From this point you can run the program two ways — either using the keyboard, or with a joystick or Color Mouse. Each option on the main menu has a letter; each option on the submenus is numbered. So, to print a 16-level image you'd press P (Printer menu) and then 2. With the joystick you'd move a black bar to the printer entry, press the firebutton, then go to the Print 16 level entry and fire again. The joystick lets you work the Digisector from behind the TV camera, which should save quite a bit of running back and forth.

Pressing G will start the fast five-level scan, which uses the 256-by-192 graphics mode but scans a 128-by-128 image; you'll see the output of your camera (or whatever) on the CoCo screen. At this point there are two ways to adjust the picture; you can either adjust brightness and contrast individually, or you can adjust contrast (with *C-See* taking care of the brightness) and then play with the vertical and horizontal dithering to get the best results before saving the picture file.

The DS-69B's major attraction to many users (including me) is its 16-level capability; you can grab an image at either 128-by-128 or 256-by-256 resolution, save it to disk and print it on a variety of printers. These include Tandy's DMP- 100, 105, 120, 200, 400 and 500 as well as Epson, Star Micronics and other dot-matrix printers.

The 16-level mode is almost as easy to use as the five-level; you get a fast scan screen and set the brightness and contrast, then press the ENTER key or firebutton to start the scan. On the CoCo 1 or 2 you'll then see a five-level dithered picture; on the CoCo 3 you'll get a much better display using the 3's gray-scale capabilities along with some dithering. (This display will be quite a bit taller than usual; an RGB monitor should be able to handle it with no difficulty, but some TV sets may cut it off at the top or bottom.) There's also a 16-color mode available, which produces a rather bizarre effect but is actually useful for gray-scale differentiation; similar techniques are used for weather radar, satellite photos and medical imaging systems.

There's a catch to the 16-level capture modes; they're slow. The 256-by-256 mode takes 15 seconds to scan the image; the 128-by-128 mode takes three seconds, and your subject must be absolutely motionless during this period. This makes the Digisector more suited to use with a camera than for grabbing frames from TV programs. If you want to use a VCR to display still frames, it has to be capable of doing it without any noise or sync problems; if your still picture jiggles up and down the screen, or if you see noise bars, the Digisector will be unable to handle it because it deals with the video signal much differently than a TV set does. (If you have a LaserVision player, the "CAV" discs that play for 30 minutes on a side will provide good freeze frames.)

The 16-level pictures print very nicely on most printers; the 256-by-256 mode provides especially good results. The only difficulty here (a common one with programs that print graphics) is that you will need a fresh ribbon to get a good result in dark areas; if the ribbon is somewhat worn you'll get a washed-out picture. The heavy printing load also wears out ribbons rather quickly, simply because of the high density involved.

Overall, the DS-69B Digisector is a winner in its field and still the champion in the CoCo frame-grabber business.

(The Micro Works, P.O. Box 1110, Del Mar, CA 92014, 619-942-2400; $149.95)

—Ed Ellers

Software CoCo 3

Dino DataBase— Yabba Dabba Doo, Fred and Dino, Too

Well, maybe only Dino and a few of his buddies, cousins, aunts and uncles, etc. *Dino DataBase* is a disk-based database containing all the classified types of dinosaurs (193) and information on how each name is pronounced (like a dictionary listing, and it includes the Latin meaning of the name), the dinosaur's order and family, the time period in which it lived, two or three places where it was discovered (shown on a graphic world map), its length from head to tail, and to top it off, a "picture" of the animal.

Dino DataBase is a static database in that you cannot add or delete entries, but since it covers all the known classifications of dinosaurs it should not become outdated — barring some new discovery. It works on the Color Computer 3 with at least one disk drive.

Getting started is as easy as turning on the machine, slipping the disk into Drive 0 and typing `RUN"D"`. You will be asked if you are using an RGB or composite monitor or TV, and the introductory screen will appear.

The screen is divided into four "windows," each of which holds some type of information on the current dinosaur. The upper-left window lists the name of the dinosaur and its correct pronunciation, followed by the Latin meaning of its name. This is interesting because many times you can look at the picture and see how the dinosaur got its name. For example, Hadrosaurus means "big lizard." It *looks* like a lizard and is 30 feet long (that's big in my book).

Following next are the animal's order and family. The manual devotes two pages to talking about how classifications are made, making it as educational as the program itself. Next, the listing gives the time period in which the animal lived, such as the Late Triassic. A simple timeline would help immensely. (I had a chance to talk to the programmer of *Dino DataBase*, and he said he is considering adding a timeline to the manual.)

The last two pieces of information tell two places the dinosaur was discovered and its length in feet. The upper-right window shows a line drawing of the dinosaur.

The lower-left window lists other dinosaurs related (in the same family) to the current dinosaur. The "main" dinosaur of the family is highlighted. Through experimentation it seems that the "main" dinosaurs are the only graphic entries in the database. The lower-right window displays a world map with crosses to indicate the two locations where the dinosaurs were found. The layout of the windows is pleasing and consistent, so younger users will always know where to find specific information.

The commands are listed onscreen in a pull-down menu. Pressing any key will page a cursor through the seven commands. You can "Shut" the pull-down menu off to see the full screen. "Next" and "Back" page through the database, forward and backward, respectively. "Help" explains the commands in the pull-down window, and "Quit" exits to BASIC.

The meat of the program lies in the "Find" and "View" commands. Find searches for a specific dinosaur. If the correct spelling is not known, the first two or three letters will get you close. If you don't get the desired dinosaur right away, you can type in the first four letters and search the database again. After finding the dinosaur you want, you can go to the View screen to see the entry's information. My only suggestion here is that I would like to see the database alphabetized. This would allow me to type in the first three letters, then page forward or backward, alphabetically, to find the specific dinosaur I am looking for rather than struggling with a fourth letter. For those of us who have trouble spelling, the manual provides a list of all dinosaurs in the database.

The View command works like Find, allowing you to type in the name, or as many letters as you know, to locate a specific dinosaur. This is called "rapid view" because it involves no graphics. By paging through the database you can dump any entry you want to your printer. Each entry is five lines long, allowing about 11 entries per page. When exiting the View function, you return to the main screen, but not the entry located with the view command. You return to the same entry you left when entering View. (View is a faster search, containing text information on all dinosaurs in the database — but no graphics. Search allows you to view only the main members of a family, but it does show graphic information.)

> ***" . . . Not only does Dino DataBase teach students about dinosaurs, it will also introduce many of them to online searching and the necessary skills for finding information within a database structure."***

The manual, 11 pages long, is educational. The introduction briefly describes what happens when a dinosaur is discovered. The manual also goes briefly into how dinosaurs are classified. The remainder tells how to use the program. The manual is easy to read, and getting up and running takes only about 20 minutes.

Overall, my only suggestion is that the user be informed of how the database is ordered. If I know how a database is ordered I can determine how to find an entry. As it stands, I have no idea as to why one dinosaur follows another in the graphics window. The reason I mention this is because not only does *Dino DataBase* teach students about dinosaurs, it will also introduce many of them to online searching and the necessary skills for finding information within a database structure.

I give *Dino DataBase* a big *Yabba Dabba Doo!* It's educational and has a very impressive user interface. It's easy for youngsters to use and simple to learn. Dinosaurs are a hot item with kids today — just look around the malls. And if your child is crazy about them, this might be the best

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*TRS-80 is a trademark of Tandy Corp.

introduce them to computers and the concept of databases. It would also be a great program for science teachers who have access to the Color Computer in their classrooms.

(RAM Electronics, 814 Josephine St., Monmouth, OR 97361, 503-838-0139; $19.95)

—Kay Cornwell

Software CoCo 3

CoCo 3 Wheel— Out for a Spin

Well, I wonder what's in the ol' mailbox today? Bills, junk mail, newspaper, package from RAINBOW. . .Hold on! What's this (rip, rip, tear)? Oh boy! My next review assignment! What did I get this time? CoCo 3 Wheel—a Wheel of Fortune game? Yuck! I hate that game!

That was my initial reaction to *CoCo 3 Wheel*. I may be the only person alive who never really understood why anyone would want to buy a vowel — so to be honest, I wasn't immediately thrilled with the program in front of me.

Well, let's fire it up anyway and see what happens. Where are the instructions? No instructions? Either someone fouled up or this is incredibly easy to run. Okay, I'll do a `DIR`. *Hmmmm, one BASIC file, one ml file.* `RUN"WHEEL"`. *Ah! A title page and some instructions, good. I guess I should have read the label where it says* `RUN"WHEEL"`.

As you may have guessed, from this point game play is very much like the TV version of the show. You are presented with a puzzle consisting of blanks instead of letters, and you must guess letters and eventually guess the puzzle. This version does not have Vanna walk over and turn the letters for you. I've seen a version with that feature: It's cute the first few times but gets old real quick and slows up the game. I did not miss her.

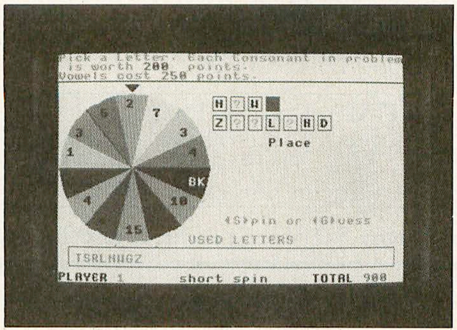
Wheel requires a CoCo 3 and a disk drive. The only disk-specific command I found in my listing was a `LOADM` command, but no indication was given as to whether or not a tape version is available. Because it uses the 3's Hi-Res screen, it will not run on CoCo 1 or 2, but a version is available for those machines. Two hundred puzzles are included in the program, 50 in each of the four categories of persons, places, things and phrases. That should keep you busy for a while. But if it doesn't, instructions are included in the listing of the program for adding your own.

After playing a round or two, Becky and Lori, my daughters, had discovered the new toy. The usual question came: "Daddy, can we play?" Not being a Wheel fan, after a few instructions, I willingly surrendered the keyboard and went to see what was happening on the ball game. An hour later I realized they were still playing the game. My team was losing, so I parked behind them to watch. They seemed to be stuck on a rather lengthy phrase and asked me for help. Since the used letter board showed that my two letters had already been guessed, we decided to buy a vowel. (I'm so ashamed.) The E's provided just enough of a clue for a correct guess. They wanted to play again, this time the two of them against me. They beat me! *Twice!*

Wait a minute! I thought I hated this game. Maybe it's just Pat and Vanna I don't like because this is fun. And if you think I'm going to stop just because a 12- and a 9-year-old cleaned my clock for me, you're crazy! Seriously, as I stated, I am not a "Wheel Watcher." I don't like the show. But this is a fascinating game, and I enjoyed playing it. A friend and I plugged in some (how should I phrase this?) adults-only puzzles. That was a real riot. Now for the "howevers."

Game play is very impersonal. I prefer to be called Randy rather than Player 1 or Player 6. Since the program is written in BASIC, a short input statement can take care of that.

The game spins the wheel by using a palette-switching routine. It apparently uses 15 of the 16 available palettes, which makes for a colorful wheel but also causes the lettering on the screen to change colors as the wheel spins. Once it stops, the writing on the screen returns to a preset color except for the place holders for unrevealed letters. This sometimes creates eye-straining color combinations, like yellow on white. A better idea may have been to use only eight palettes for the wheel and reserve the other eight palettes to fancy up the text display.



```
ick a Letter. Each Consonant in proble
is worth 200 points.
Vowels cost 250 points.
```

```
<S>pin or <G>uess
USED LETTERS
TSRLNHGZ
PLAYER 1        short spin        TOTAL 900
```

A handy feature is the ability to give up on a puzzle. This is quite nice when the children play and have never heard of the person, phrase or whatever. This feature could have been enhanced by the addition of a "vowels only remaining" signal.

Also missing is the bonus round. I was able to plug in a routine that lets you select five consonants and a vowel, and gives you one guess at the puzzle.

Multiple-round play would have been a big plus. As is, if you elect to play again, all scores are reset to zero. A grand total score, at the end of, say, three rounds, would be great.

The program comes to us from SPORTSware and sells for $21, which I feel is just a bit high for the game as presented. *CoCo 3 Wheel* for the CoCo 3 is fun and habit-forming. With just a few minor improvements it would be an excellent addition to your games library, and at the current price, more than a bargain.

(SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, 419-389-1515; $21)

—Randy Cassel

Software CoCo 1, 2 & 3

KJV on Disk— Books of the Bible on Your CoCo

KJV on Disk is for anyone who studies the Bible. The two disks I reviewed contain the text of the books of Luke and John in the King James Version of the Bible in ASCII code. One of the disks divides the 24 chapters of Luke into seven files. The author's intentions are, eventually, to have available the entire Bible on disk, starting with the New Testament. Matthew and Mark are also available.

A `README` file on each disk explains that the files were created with *Telewriter-64* and that a word processor is necessary to make any practical use of them. However, a file called `TYPE` allows the viewing of the files a line at a time, which can be really ugly on a CoCo 2 with no lowercase option.

Since a program review ought to help potential buyers judge how to utilize the program, I'll offer some thought about how this program might be used.

First, the obvious purpose is to read verses off the screen. Unless you are really into hi-tech, this doesn't seem to have any advantages over reading them out of your own Bible. I do see that this might be an application for the seeing-impaired. The larger screen letter sizes could be chosen. In this case, the `TYPE` program, which produces text on the 32-character CoCo screen, might find further utility.

But there are possibilities other than simply reading the file. Students of the Bible are often ministers and Bible teachers preparing sermons and lessons to be delivered orally or included in material for publication. A not-too-involved procedure can be used to import portions of these files for use in another word processing document. For *Telewriter-64*, first save the quotation under a unique name, then read in the file (under "Append") at the point in your own document where you want the quotation to appear. Many other CoCo word processors support block saves and reads.

Another application would be to find words and phrases using your word processor's search function, much the same way a concordance does. You are limited, however, by the portions of each book contained in memory at any one time. A similar idea is to gather such facts as how often the name "Jesus" or the word "savior" is used in any given portion of these books.

Another use that might not appear obvious is to print the text or portions of it to have scriptures you can read and annotate. Many people like to highlight and comment on the printed page when they read. It helps them concentrate on themes within the work or save flashes of ideas before they fade away. Writing all over one's personal Bible, however, is not a good idea for a number of reasons. An easily made printout provides a good alternative.

I am sure that many of you are able to think of more inventive ways to employ these text files. Other word processors, especially those available on a CoCo 3, are also likely to increase the possibilities for these files.

One of the restrictions you may face is on the longer text files. The documentation says that 24K of buffer space is necessary. The unpatched version of *Telewriter-64* is able to handle this. However, if you are using a CoCo 2 with *Telepatch*, you must make a new patched version of *TW-64* that does not include the disk I/O menu routines in RAM. This frees 4K of RAM that is needed on five of the files on these two disks. No modifications are necessary if you're using *Ultra-Telepatch*.

Using *TW-64*, the 61-character screen offers the least problem with wordwrap, although there is an occasional blank line on the text screen.

If you purchase any of the programs in this series, I suggest you make a label for each disk jacket that tells the chapters contained in each disk file. This information is found on the disks in a `README` file.

Each disk in the *KJV on Disk* series costs $3, a quite reasonable sum if you feel that these Bible books would be at all useful to you.

(BDS Software, PO Box 485, Glenview, IL 60025, 312-998-1656; $3 each)

—Dennis Church

Software CoCo 1, 2 & 3

Vehicle Cost Printout— Time for a Trade-In?

Have you ever wondered how much it really costs to operate your car? Is it really running the same after all these years? Would you be better off keeping the family "klunker" or buying a new car? *Vehicle Cost Printout* can help you determine the answers.

> ***" Vehicle Cost Printout is intended mainly to provide an annual report printout, but it can also be used to obtain monthly and/or quarterly printouts if you so desire."***

Vehicle Cost Printout will run on any Color Computer 1, 2 or 3 with Extended BASIC and 64K of memory. This program is available for either a cassette- or disk-based system. You also need a "smart" printer capable of underlined, condensed and elongated printing in order to have a hard copy of your car's cost statistics, including cost per mile.

The first thing you should do after loading the program is to configure it to your printer (it comes configured for a C. Itoh 8510). Therefore, you should be familiar with your printer's baud rates, a few of its function codes and Extended BASIC's `EDIT` command. There are only a few lines to edit, and the manual gives you a complete description of the codes and line numbers, so this should be no problem for most people. Configure the program, make a backup for your own use, then put the original in a safe place.

The program itself is relatively easy to operate as it is menu-driven, and the menus are self-explanatory. *Vehicle Cost Printout* allows you to input data, save/load data files, scan/modify or insert/delete entries, and, of course, send data to your printer for a hard copy. There is enough room in the program's database for an average of about 20 entries per month, which should be plenty for anyone. You have to make a separate data file for each vehicle. Categories of data include date, cost of fuel (per gallon), total cost of fuel (full tank), mileage, other expenses and mileage at the time you incur these expenses. There is even a line for invoice numbers.

Vehicle Cost Printout is intended mainly to provide an annual report printout, but it can also be used to obtain monthly and/or quarterly printouts if you so desire. The program allows you to decide if you want a grand total for any of these time periods. If you want to carry the annual total over into another year, as you have to keep a separate data file for each year, you must change a few variables in the program itself. The manual provides adequate documentation in order for you to accomplish this.

There's one problem I encountered while using this program. The manual states that "The first entry is for setup only and will not give a full printout, nor will the dollar amount for fuel be added to any totals." Simple enough, right? Well, I had input my first entry (the setup screen), then entered my second entry using the same mileage figure as in the first entry. Example: For the first entry, the odometer mileage equalled 100 miles; the second odometer entry had mileage at 100 miles also. Anxious to see the printout on paper, I directed the program to begin printing, but before it could finish the program was stopped by a "/0" Error (can't divide by zero). This happened because the program calculates that 100-100=0, which is correct, but when it goes on to divide total costs by mileage to get the cost per mile — it can't because, as stated before, the computer cannot divide by zero.

This is a minor problem, I'll admit, because most people will not use the program in this fashion. But I was a bit confused until I looked at the program and found out how it carried out its calculations. Therefore, I think the manual should go a little further in explaining the purpose or function of the setup entry. Other than this one exception, the program performed flawlessly in all areas.

The manual is well-written in that it is straightforward, takes the user through each function step-by-step and offers some good

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In Quest of the Star Lord (CoCo III only) See Aug '88 review. This is **THE** graphics adventure for the CoCo III! Unparalleled 320 x 200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. Full **4 Disk sides** of mind-numbing adventure! Requires 128k CoCo III and Disk drive. **HINT SHEET** .... $3.95 (+ $1.00 S&H by itself) Disk $34.95

KUNG-FU DUDE (CoCo I/II/III) See Feb. '88 review. An exciting arcade game. The **BEST** karate game ever for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective! Spectacular graphics, sound effects, and animation! Requires 64k, Disk drive, and Joystick. Now displays color on CM8. Disk $24.95

PYRAMIX (CoCo III only) See Dec. '87 review. Brilliant colors, sharp graphics, and hot action in this 100% ML arcade game. You'll enjoy hopping Kubix around the pyramid, avoiding Kaderf, Smack, Smuck, & the Death Square! Disk .. $19.95

NEW **AD&D Character's Companion** (CoCo I/II/III) This great timesaving utility helps create compatible AD&D characters. Includes dice rolling routine, pick ability, race & class. Buy from the Players Handbook, magic items & spell materials. Save, load, and print character info. 3 Disk sides $24.95

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Champion (CoCo I/II/III) See May '87 review. Become a superhero in this action adventure! Disk..$19.95

Dragon Blade (CoCo I/II/III) See Nov '86 review. Slay evil dragon in this 64k animated adventure! Disk..$19.95

advice such as saving your data after you modify it, something I fail to do at times. This can save people from losing their data and having to re-enter it. The author offers support for any problems you might encounter, and the program comes with a demonstration data file.

As an experienced programmer and user, I feel the price is a little high for this type of program. Don't get me wrong — this is a very, very useful program, especially with the way the economy is, and many people will feel the price is justified. But I also feel that the author could expand his potential market by dropping the price a few dollars.

All in all, if you wonder if your car is costing you more now than it did, or if you just want to keep track of how much your car costs to operate, then take a look at *Vehicle Cost Printout*.

(Alan Hanusiak, 37 Grand Ave., Rockville, CT 06066, 203-875-2027; $18: First product review from this company appearing in THE RAINBOW.)

—Richard L. McNabb

Software

CoCo 3

Fontgen— CoCo 3 Fonts, Icons and Borders

Hi-Res graphics been a little boring lately? Need some nice frilly borders to impress your significant other? Want to make a big bold statement to the world? Do `DRAW` statements make you break out in hives? Well then, maybe *Fontgen* from JR & JR Softstuff is what you need.

Fontgen is a collection of screen display fonts, icons and borders that can be used to replace or supplement the standard CoCo 3 BASIC Hi-Res graphic font. It comes packaged with a font editor, a machine language subroutine used to load four fonts at one time, BASIC subroutines to print the larger-than-standard fonts (including icons and borders) and a demo program.

The package takes advantage of the fact that the Hi-Res display font (and the rest of BASIC) resides in RAM. Standard size fonts replace the Tandy-provided font on a one-to-one basis. Larger fonts, icons and borders require multiple positions to store a character. For example, "Bigfont" requires nine characters in a three-by-three group to form one Bigfont letter. For this reason, the Bigfont alphabet is stored across three font datasets, which makes the ability to have more than one font in memory important.

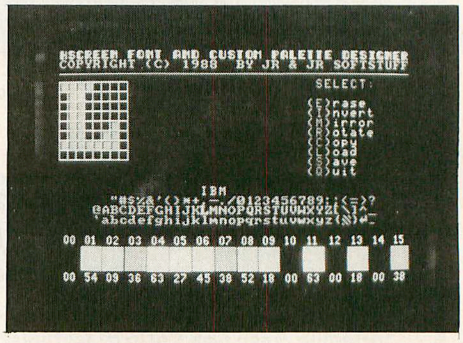
The supplied font editor allows you to create or edit standard fonts in an eight-by-eight matrix. The larger fonts require planning because only part of the character (eight-by-eight out of 24-by-24) is available for editing at a time and is thus harder to visualize. Except for overly sensitive cursor keys, the program works as it should. Functions are provided to aid in creating or modifying character fonts. While some of the functions may be a little confusing to those of us used to paint programs ("Rotate" shifts and "Mirror" flips), they are useful.

The font editor also has a function to allow you to manipulate the palette. It allows you to set the color in the 16 palette cells to any one of the 64 available colors. You can then save your selections as BASIC statements to be included in your own program. This feature is nice but seems to me to be only distantly related to fonts.

The standard size fonts can be used directly with `HPRINT` by loading them into memory, but the large fonts (including icons and borders) require special methods to display. JR & JR Softstuff provides BASIC subroutines that can be used to print these larger characters. You can also use them as examples to write your own routines, if you prefer.

For the large fonts, or if you want to use multiple fonts without a lot of disk access, a machine language program is provided to store up to four font datasets in memory at one time. Your BASIC program transfers the fonts back and forth in memory via `DEFUSR` calls.

All in all, the package is fairly easy to use and the program easy to follow. This is fortunate because the documentation is not. I received a dozen loose sheets of paper, printed on both sides. Except for the cover, there are no graphics or illustrations. Details that would have been easy to pick out in a table are buried in the text. Indentation is nonexistent, and no index is provided. The best that can be said is that most of the information you need is there. You just have to dig it out.



Even so, if you would like to spice up your Hi-Res displays, the package will save you some time, and the price won't break you. However, if you're just starting out in programming, some of the features may have to wait until you have a little more experience.

I had no major problems with *Fontgen*, but JR & JR Softstuff does provide a number for technical assistance. No hours are listed, but I did reach the order number Saturday afternoon. You pay for any calls you make.

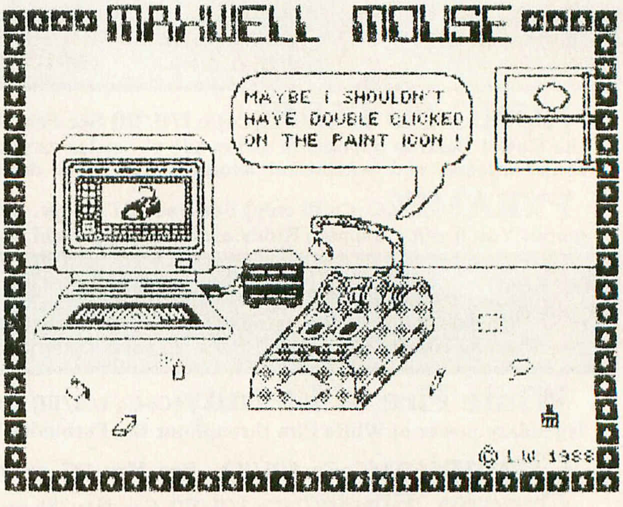
Fontgen requires a Color Computer 3 with 128K and at least one disk drive. The package will work with a TV or a composite monitor, but you won't be pleased with the results. An RGB monitor is a much better choice.

(JR & JR Softstuff, P.O. Box 118, Lompoc, CA 93438, 805-735-3889; $24.95 + $3 S/H)

—Jesse R. Strawbridge

Maxwell Mouse

By Logan Ward


MAXWELL MOUSE
MAYBE I SHOULDN'T HAVE DOUBLE CLICKED ON THE PAINT ICON !
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Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.

Border Disk #1, a disk containing more than 175 borders, supplementing the *CoCo Graphics Designer Plus* desktop publishing package. Border graphics elements include floppy disks, dogs, musical notes, stars and more. For the CoCo 3 and *Graphics Designer Plus. Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421, (781) 297-2385; $14.95 plus $3 S/H.*

CoCo Calligrapher, a font package that printer owners can use to create invitations, flyers, newsletters and more. Three ½-inch fonts are included, and more than 135 additional fonts are available. Comes on tape or disk for the CoCo 1, 2 and 3 and requires a dot-matrix printer capable of bit image printing. *Sugar Software, P.O. Box 7466, Hollywood, FL 33081, (305) 981-1241; $24.95 plus $1.50 S/H.*

Fast Formatter, a machine language utility that formats floppy disks in both Drive 0 and Drive 1. For the CoCo 1, 2 or 3, requiring two disk drives. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $5.*

Font Disks A & B, two font collections to supplement *CoCo Graphics Designer Plus. Font Disk A* contains Banner, Bold3, Digital, Shadow, Stencil, Stripes, Type, Variety, Western and two symbol fonts. *Font Disk B* contains these fonts: Arcade, Alien, Baroque, Baroque 2, Block, Computer, Circle, Circle2, Cube, Cube2, Deco, Gray, Script and Script 2. Requires a CoCo 3 and *CoCo Graphics Designer Plus. Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421, (718) 296-2385; $14.95 each, plus $3 S/H.*

KJV on Disk: Romans, I Corinthians and II Corinthians, three books of The King James version of the Bible on disk in ASCII files for the CoCo 1, 2 and 3. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $3.*

Lesson Planner, a program to help teachers of any grade level create and print lesson plans, covering materials, objectives, procedures and evaluation. Plans can be created new or saved and edited. Requires a disk drive, a printer, and a CoCo 1, 2 or 3 with at least 32K. *Tothian Software, P.O. Box 663, Rimersburg, PA 16248; $24.95.*

Lock Master, a utility that locks normal Disk BASIC disks so that a "disk zapper" cannot break them. It locks the directory and the DOS track. Users unlock the disk with a password. For CoCos 1, 2 and 3. *Right Brothers Software, 1173 Niagara St., Denver, CO 80220, (303) 377-3409; $14.95.*

Master Code, a game of logic and luck in which users try to solve a code of four colors using clues provided by the computer. There are six colors possible. It works by "branching," a form of artificial intelligence. The program is written in BASIC, and a listing is included. Requires a CoCo 1, 2 or 3 with a minimum of 16K. *High Altitude Software, 339 32 1/2 Road, Palisade, CO 81526, (303) 434-7825; $19.95.*

Max Font Set, a four-disk assortment of more than 100 type styles for use with Colorware's graphics programs *CoCo Max I, II* and *III. Colorware, 242-W West Ave., Darien, CT 06820, (203) 656-1806; $49.95 plus $3 S/H.*

Max-10 Font Set, a collection of 36 fonts for use with the *Max-10* word processor/desktop publisher. Fonts include Frontier, Swan Song, Memphis, Futura and San Francisco. Requires a CoCo 3 and *Max-10. Colorware, 242-W West Ave., Darien, CT 06820, (203) 656-1806; $29.95 plus $3 S/H.*

Mutant Miners, a machine language arcade game in which your character is trapped in a uranium mine deep within the earth. To reach the surface, you must battle your way up through the ranks of those who have suffered a similar fate, but over time have mutated into monsters. For the Color Computer 1, 2 or 3. *JR & JR Softstuff, P.O. Box 118, Lompoc, CA 93438, (805) 735-3889; $19.95 plus $3 S/H.*

NewsArt A thru Z, a collection of 26 clip art disks for the **Newspaper Plus** CoCo 3 desktop publisher. Each disk contains an assortment of graphics. Images range from sports to religious depictions. *Second City Software, P.O. Box 72956, Roselle, IL 60172, 312-653-5610; $9.95 each disk, or complete set for $100 plus $2.50 S/H.*

Newspaper Plus, a CoCo 3 desktop publishing package that includes a font disk with 22 fonts and a graphics disk with 50 clip art pictures. Users can create banners, newsletters and signs. Requires a CoCo 3 and a disk drive. Owners of *The Newspaper* can upgrade by sending in their original system disk and $19.95 plus $2.50 shipping; those who purchased *The Newspaper* directly from Second City Software can upgrade free of charge. *Second City Software, P.O. Box 72956, Roselle, IL 60172, 312-653-5610; $48.95 plus $2.50 S/H.*

Newspaper Plus Graphics Disk I, a supplement for *Newspaper Plus*, this disk contains 50 clip art files, three fonts and 10 fill patterns. *Second City Software, P.O. Box 72956, Roselle, IL 60172, 312-653-5610; $19.95 plus $2.50 S/H.*

NX-1000 Rainbow Printer Driver Kit, a printer driver for the NX-1000 Rainbow color printer. It prints out *CoCo Max III* or other `HSCREEN 2` pictures. Up to 125 colors can be reproduced in a palette of 64 at a time. Requires a CoCo 3, an NX-1000 Rainbow and *CoCo Max III. Colorware, 242-W West Ave., Darien, CT 06820, (203) 656-1806; $19.95 plus $3 S/H.*

OS-9 Calligrapher, a program similar to the Disk BASIC *CoCo Calligrapher*, but written for OS-9 Level I or II. It comes with three fonts to allow users to print newsletters, flyers and more. Standard text can be read in and printed out in the user's choice of fonts. Requires a dot-matrix printer capable of bit image printing. Other fonts are available. *Sugar Software, P.O. Box 7466, Hollywood, FL 33081, (305) 981-1241; $24.95 plus $1.50 S/H.*

PertASCII, a one-player or multiuser word game for OS-9 levels I and II. Up to 15 people can play at once when accessing a 512K machine via modem or remote terminal. On 64K or 128K machines, two people can play. The goal is to outscore opponents in making words out of random letters. Includes a built-in dictionary. Requires a CoCo 1, 2 or 3 with at least 64K memory, OS-9 Level I or II, and a disk drive. *Burke & Burke, P.O. Box 58342, Renton, WA 90058, (206) 235-0917; $19.95 plus $1.50 S/H.*

Ultra-Merge, a program that lets users create personalized letters, forms, etc., using database files created by *Ultra-Base* and any word processor that can save files in ASCII format. Comes on disk only for 64K CoCos 1, 2 and 3. *Tothian Software, Inc., P.O. Box 663, Rimersburg, PA 16248; $24.95; $39.95 for both* Ultra-Base *and* Ultra-Merge.

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

—Lauren Willoughby

Get your modem to work with OS-9 Level II for under $20

The Forgotten Chip

By Carl Austin Bennett

While a Serial I/O port appears on the back of every CoCo, it appears to be unusable in any OS-9 communication program. It is suited only to use with a serial printer; a modem connected to it is not even usable with Radio Shack's own *Desk-Mate 3* software.

Radio Shack suggested a Multi-Pak interface and a Deluxe RS-232 Pak as a suitable replacement for the "bit-banger." Although this entailed a cost quite a bit higher than the CoCo 3 modifications I am about to describe, it did offer a second serial port. Unfortunately, both of these items have been discontinued. Some alternatives to the RS-232 Pak are offered by CRC Computers in Montreal, but these require either a Multi-Pak or a Disto Super Controller.

Unless you need two serial ports, it may be more economical to upgrade the existing serial interface for OS-9 operation. Only one chip, a crystal, two diodes and a resistor are required. You must make 22 connections to the CoCo 3 printed circuit board. Some electronics experience helps, and the project can be completed in one weekend for under $20. Only one byte of the OS-9 Boot file needs to be changed to make this chip operate with any OS-9 program, and existing commands such as `PRINT #-2` (in Disk BASIC) are not affected in any way.

All of these upgrades use a special chip to convert the information being sent from the parallel format (eight bits at a time) used by the 6809 to a serial format (in which all bits are sent, one at a time on a single wire). This chip is the Rockwell R6551 Asynchronous Communication Interface Adapter, described in more detail in *Turn of the Screw — All About Serial Packs* by Tony DeStefano (RAINBOW, August '88) or in data sheets published by the manufacturer. It is capable of sending and receiving data at up to 19,200 bits per second (19,200 bits of transmitted data is equivalent to one full 80-by-24 text screen).

OS-9 already contains the instructions needed to make this chip work (the `ACIAPAK` driver and `/t2` descriptor). It need only be told where the chip is located. This is done by using the `Modpatch` command to change one byte of `/t2`. At the OS-9 prompt, type:

```
modpatch /t2
c 10 68 30
v
```

Press CTRL-BREAK to end the process. The change can then be saved to a new disk using `Cobbler` (described in the OS-9 Level II manual).

That's the easy part — now something more difficult: the task of adding the 6551 chip to the computer. All of the usual warnings apply here: Precautions must be taken against damage due to static electricity; any modification to the computer will void the Radio Shack warranty; some errors in construction may damage your computer or cause the system to crash; all connections should be verified before applying power; and an ohmmeter should be used to check for short circuits.

Also, all connections and measurements must be made with the power disconnected. Reversal of the power leads or connection of any lead to voltages less than zero or more than five volts will destroy the chip. While this modification has been tested in a CoCo 3 and works fine, there is no guarantee if you choose to use information contained in the article.

The 6551 works best placed in a 28-pin socket on a small circuit-board of its own. The crystal should be placed near 6551 pins 6 and 7; the diodes and resistor are best placed near Pin 10. The board may be hidden in the space underneath the CoCo 3 keyboard. It may be best to wait until all connections are made (and correct operation of the CoCo 3 observed) before plugging in the 6551.

Sixteen connections are made to the

Carl A. Bennett is an electrical engineering student from Kingston, Ontario. He owns a 512K CoCo 3 with a 1200-baud modem, a modified electronic typewriter as a printer, and OS-9 Level II. He also once had the misfortune of having to write a terminal program using the infamous "bit-banger" serial port.

underside of the expansion connector (at the right-hand side of the computer). These are shown in Figure 1.

As these connection points are spaced relatively closely, it may be best to make the connections using a 4- or 8-conductor ribbon cable of relatively small size, to make the connections to the expansion connector before making the connections to the 6551, and to deal with all connections to odd-numbered pins first. After making the first eight connections, verify proper operation (i.e., no short circuits and the computer working normally) before proceeding with the remaining eight. This makes location of any mistakes much easier.

Once these 16 connections have been made and verified, there are six more connections to make to the computer. These are:

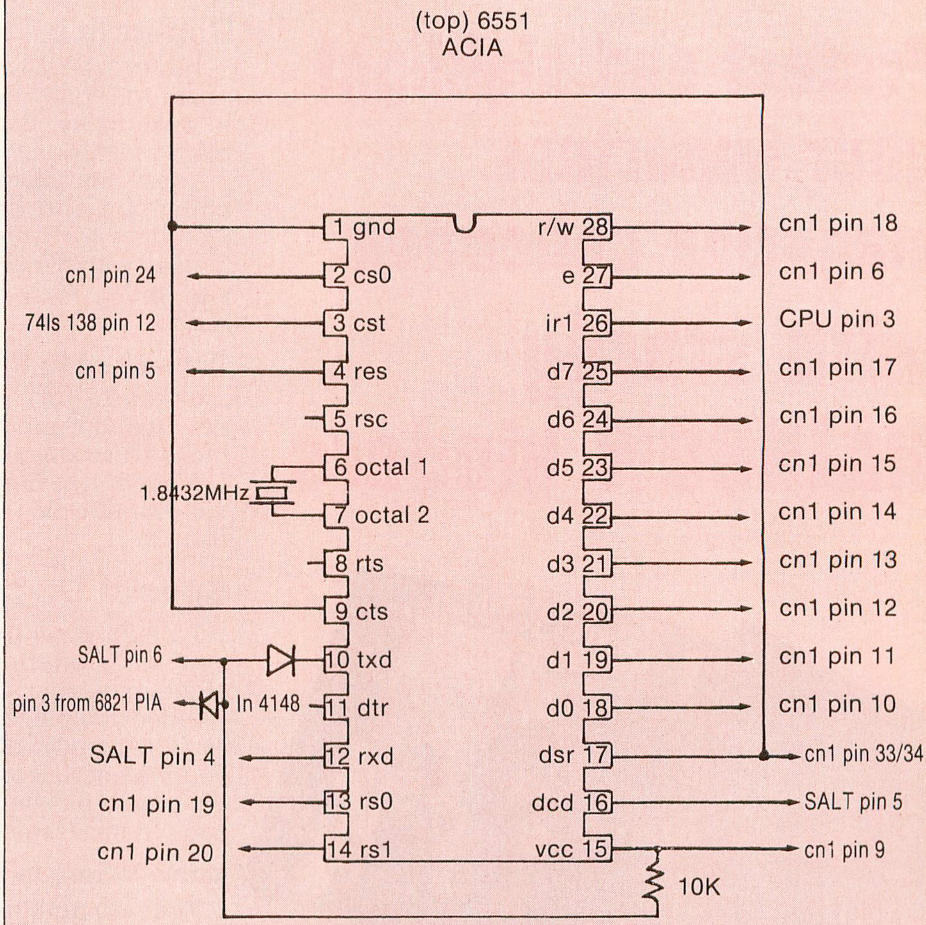
1) from Pin 4 (Receive Data) on IC8 (the 77527 SALT chip, on the lower left corner of the CoCo 3 circuit board) to Pin 12 of the 6551.
2) from Pin 5 (Carrier Detect) on IC8 (SALT) to Pin 16 of the 6551.
3) from Pin 6 (Transmit Data) on IC8 (SALT) to the anodes of the two diodes (1N4148) and to one side of the 10K resistor connected to +5 volts.
4) the previously-existing connection from IC4 (68B21 PIA) Pin 3 to IC8 (SALT) Pin 6 must be removed — connect IC4 Pin 3 to the cathode of one of the diodes. Connect the cathode of the other diode to Pin 10 (Transmit Data) of the 651.
5) from Pin 12 (*Chip Select) of IC9 (74LS138 Address Decoder — located near the ACVC [Advanced Color Video Chip]) to Pin 3 of the 6551.
6) from Pin 3 (*Int) of the CPU (IC1 — 68B09E, or Pin 37 or 38 of the LSC81001 PIA [IC5]) to Pin 26 (*Interrupt Request) of the 6551.

A 1.8432 MHz crystal is to be connected directly to pins 6 and 7 of the 6551 chip. At this point, the circuit is ready to be tested.

Making a Serial Cable for the CoCo 3

To connect the serial port of your computer to a modem, a four-wire cable is needed. This cable may be made from several feet of telephone wire with a 4-pin DIN connector (Radio Shack Cat. No. 274-007) on one end and a DB25 connector (Radio Shack Cat. No. 256-1547) on the other.

Note that the cable for use with modem may not be the same as that used with a serial printer. For a modem,


(top) 6551
ACIA
1 gnd
2 cs0
3 cst
4 res
5 rsc
6 octal 1
7 octal 2
8 rts
9 cts
10 txd
11 dtr
12 rxd
13 rs0
14 rs1
r/w 28
e 27
ir1 26
d7 25
d6 24
d5 23
d4 22
d3 21
d2 20
d1 19
d0 18
dsr 17
dcd 16
vcc 15
cn1 pin 24
74ls 138 pin 12
cn1 pin 5
1.8432MHz
SALT pin 6
pin 3 from 6821 PIA
In 4148
SALT pin 4
cn1 pin 19
cn1 pin 20
cn1 pin 18
cn1 pin 6
CPU pin 3
cn1 pin 17
cn1 pin 16
cn1 pin 15
cn1 pin 14
cn1 pin 13
cn1 pin 12
cn1 pin 11
cn1 pin 10
cn1 pin 33/34
SALT pin 5
cn1 pin 9
10K

cn 1 is the 40-pin expansion connector
SALT is IC8 (77527)
CPU is IC1 (68B09E)
PIA is IC4 (68B21)
The existing trace between PIA pin 3, SALT pin 6 must be removed.

Expansion Connector	6551	Signal
Pin 5	Pin 4	*Reset
Pin 6	Pin 27	E (enable) clock
Pin 9	Pin 15	+5 volts
Pin 10	Pin 18	Data bit d0
Pin 11	Pin 19	Data bit d1
Pin 12	Pin 20	Data bit d2
Pin 13	Pin 21	Data bit d3
Pin 14	Pin 22	Data bit d4
Pin 15	Pin 23	Data bit d5
Pin 16	Pin 24	Data bit d6
Pin 17	Pin 25	Data bit d7
Pin 18	Pin 28	Read/*write
Pin 19	Pin 13	Address bit a0
Pin 20	Pin 14	Address bit a1
Pin 24	Pin 2	Address bit a5
Pin 33	Pin 1	Ground
	Pin 9	Clear to send
	Pin 17	Data set ready

Figure 1: Connecting the 6551

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the following connections must be made:

1) Connect Pin 1 (Carrier Detect) on the computer to Pin 8 on the modem.
2) Connect Pin 2 (Receive Data) on the computer to Pin 3 on the modem
3) Connect Pin 3 (Signal Ground) on the computer to Pin 7 on the modem.
4) Connect Pin 4 (Transmit Data) on the computer to Pin 2 on the modem.

Testing This Circuit

Due to the risk of creating a short circuit between neighboring data or address lines, it is best to check for such errors at various intervals during the construction of this circuit. An ohmmeter will quickly detect any pairs of adjacent pins that may be shorted to each other. Any short circuit in the system bus lines will also cause a screenful of garbage to appear instead of the Super Extended Color BASIC message if you attempt to use the computer. The 6551 need not be plugged in to check for either shorts or continued system operation — the computer will start without it. If you are unable to obtain normal operation with the 6551 socket empty, recheck your connections (a good idea in any case) and check for short circuits.

If all connections are in place and verified (with the system operating normally), you are ready to plug in the 6551. The pins of a new chip will generally need to be bent slightly inward before the chip can be plugged into its socket. The edge of a tabletop works well for this. Once the 6551 is in place, software may be use to check for proper operation.

If OS-9 is able to use the serial port at this point, the project is complete. If not (with the computer working), there are some simple tests that may be run under Disk BASIC.

The simplest (if your modem has "send data" and "receive data" indicators) is to turn on these indicators using `POKE 65330,12`. Use `POKE 65330,0` to turn them off. If this does not give consistent results, one of the connections to the address, data or control lines may be at fault. (See Figure 2.)

If this works, the eight connections to the data bus may be verified by running a program such as `FOR I=0 TO 255:POKE 65331,I:PRINT PEEK(65331):NEXT`, which will print numbers 0 through 255 *if the 6551* is connected.

If the 6551 will transmit but will not receive, check both the receive data and carrier detect signals. If carrier detect is not active, all received data is ignored.

Address	Bits	Contents
"bit-banger:"		
65312	1	Transmit data
65313	7	Carrier detect
65314	0	Receive data
6551 ACIA:		
65328	0-7	data
65329	0	1 if parity error
(status)	1	1 if framing error
	2	1 if overrun
	3	1 if receive buffer full
	4	1 if transmit buffer empty
	5	0 if carrier detected
	6	0 if data set ready (not used)
	7	1 if interrupt occurred
65330	0	1 enables DTR output (not used)
(command)	1	0 enables interrupt
	3,2	01 enables transmit interrupt, else 10
	4	1 for echo
	7-5	parity (000=none 011=even 001=odd)
65331	3-0	Speed (0110=300 bps 1000 =1200 bps 1010=200 bps)
(control)		
	4	1 for internal clock
	6,5	Word length (00=8 bits 01=7 bits)
	7	0 if one stop bit

Figure 2: Communication Addresses

Useful References:

1) All About Serial Paks (Turn of the Screw, Tony DiStefano, August '88 RAINBOW)
2) Color Computer Service Manual (Radio Shack #26-3334)
3) Inside OS-9 Level II (Kevin Darling, Frank Hogg Lab, Syracuse, NY, 1987).

If the 6551 registers (as displayed by `PRINT PEEK(65328); PEEK(65329); PEEK(65330); PEEK(65331)`) all appear to contain 255, then recheck the chip select inputs (pins 2 and 3 on the 6551).

Theory of Operation

Assume that a user, while running a computer communication program, presses the A key. What happens?

The computer, after scanning the keyboard, finds a key pressed and represents this by a number (A becomes 97, or 01100001 in binary). It must then send this information to another computer. A telephone line (or any serial link) cannot send eight 1s or 0s simultaneously — but it can send one bit of information at a time — a one or a zero.

When there is information to send, it sends a zero to indicate the start of one character of transmitted information. It then must send eight 1s or 0s representing the information being sent, one at a time, with the far right one being sent first. Each of these must be present for a constant and minimum length of time, as modems can only go so quickly. It then sends a 1 to indicate that it has finished sending this character. For a 2400-baud modem, all of this must occur within 1/240 of a second. But the computer has more to do than simply send information.

If your CoCo is sending data to another computer, it is very likely that the other computer is immediately sending this information back, so that it will appear on your screen. You must therefore be able to transmit and receive information at the same time, and (as if that weren't enough) if you're using OS-9, you may want to run other programs while you're sending and receiving characters. The "bit-banger" Serial I/O port requires that the program individually wait for and handle each one or zero being sent or received — at some point, it just doesn't have time to do all of this.

This is where a chip like the 6551 comes in. A program need only tell it how many bits of information to send (and at which speed), check to see that it's ready, then give it all eight 1s and 0s at the same time. The 6551 takes care of the rest. It can send and receive information at the same times, and it leaves the computer free to do other things while a character is being sent. When nothing is available to be sent, it simply sends 1s.

The 6551 looks like four locations of memory to the computer, but which four? The computer can find this out by looking in the /t2 module, which it reads from disk when you type DOS. The 6551 also needs a signal (Chip Select) to tell it that information is intended for it and not for another part of memory. A Multi-Pak Interface can provide a circuit to separate information intended for the disk-drive controller from that intended for the RS-232 Pak or some other cartridge. In the CoCo 3, however, there already exists a signal (not currently used for anything) that can be used to serve much the same purpose. By using this signal (and by putting the 6551 inside the computer itself), no Multi-Pak is required, reducing costs considerably.

Also, the RS-232 standard requires that +5 or +12 volts be used to represent a zero, and -5 or -12 volts be used to represent a one. These voltages cannot be connected directly to the 6551 without damaging it. They must instead be changed to levels that the 6551 can use directly: 0 volts for a 0, 5 volts for a 1. Any serial port that plugs into the expansion slot must contain extra chips to convert between these two sets of voltages. In the CoCo 3, the SALT (Supply And Level Translator) chip already performs this function, along with other functions related to the cassette recorder and the power supply. SALT is already being used by the existing bit-banger port, but it is quite possible to upgrade to the 6551 chip while leaving the existing port in operating condition. The inputs to the 6551 can be directly connected to their counterparts in the existing circuit without any problems. The output (Transmit Data) must be treated a little differently, so that no harm occurs if the 6551 tries to send a zero while the bit-banger is trying to send a one. This is the purpose of the resistor and diodes. A zero from the 6551 causes a diode to conduct, sending a zero to the SALT chip. A zero from the existing output has the same effect. If neither chip is active, the resistor pulls the input to the SALT chip high, causing ones to be sent. The operation is the same as that of an AND gate.

By using these existing circuits, this modification provides access to a higher-speed serial port with one chip (the 6551 itself) at a cost of under $20. Software written for the existing bit-banger serial port (such as Disk BASIC) operates as if the modification were not even present. while this does not provide a system with two serial ports, it offers most (if not all) of the other benefits of an improved serial interface for OS-9.

(Questions or comments regarding this article may be directed to the author at 493 Princess St., Apt. 604, Kingston, Ontario K7L 1C3. Please enclose an SASE when requesting a reply.)

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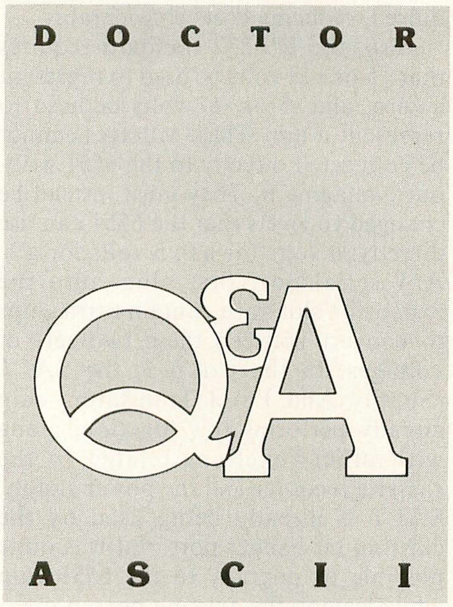

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Mini-Phono Jacks

I own a CoCo 3 and would like to connect it to a composite monitor. It was used with my IBM PC, for which I now have an EGA monitor. Is there a way to do that?

Robert Dagenais
Quebec

℞ The CoCo 3 has two female mini-phono jacks at its back. One is labeled *audio* and the other *video*. Use a cable with male mini-phono jacks (such as the one that comes with the CoCo 3 to make the video connection). If your monitor also supports audio, you will need a second cable.

BASIC Trouble

I got the back issue of RAINBOW, *as recommended by Bill Barden on Page 157 of the September '88 issue, and have successfully gotten* ED-TASM+ *to work on my 128K CoCo 3 except for one thing; I can't go to* BASIC. *It seems to go, but locks up as soon as I press* ENTER. *I think the trouble is that Line 227 of Roger Schrag's original article sends it to* `$A027`, *which is Disk Extended Color* BASIC *1.1. And I have a CoCo 3 that is Disk Extended Color* BASIC *2.1. Can you give me the correct address for 2.1?*

W.E. Veenschoten
Birmingham, Alabama

℞ A soft boot of the CoCo 3 requires a jump to `$E010`.

Mikeyterm to the Rescue

I received a modem DCM-6 and I need to know if it is possible to use the CoCo 3 without the RS-232 Pak. If so, can I use my disk drive with the modem and use a Y cable with the CoCo 3? I heard that the CoCo 3 will get too hot with this cable. Can you tell me if there is software for a modem?

George Leal
Victoria, Texas

℞ The hardware in the Tandy Deluxe RS-232 Pak is of poor quality and unsuitable for downloading software from BBSs and services like Delphi. One such product that has the capabilities you desire is *Mikeyterm*. It is available from its author, Michael Ward, at 1807 Cortez, Coral Gables, FL 33134 for $10. Also, it is not wise to use a Y cable with the CoCo since it can cause too much current draw and overheat the power supply

Using Hardware, Bypassing Software

I own a CoCo 3, Multi-Pak, two drives, CM-8 monitor, two printers and an RS-232 Pak. Therein lies the problem: I like the ability to use a modem and a printer at the same time, but the 32-character screen width used by the RS-232 Pak is less than adequate for most host systems, especially with the 40- and 80-character screen available with the CoCo 3 software. Is there communications software available that uses the 40- and 80-character screens and the RS-232's hardware while bypassing its software, or is there a way to burn a software package into an EPROM and replace the Pak's software chip? I have also had a problem while attempting to download using the Pak. Most BBSs I have used require a carriage return to start the download, but when I set the Pak for downloading and press the BREAK *key, I can no longer give the host its carriage return. Can you suggest a solution?*

Kerry L. Moline
Denver

℞ The 300-baud DCM-6 connects to a serial port, *not* the cartridge expansion port. It can be connected with a 4-pin DIN to DB25 cable. The pin connections for the serial port on the back of the color computer (clockwise from the notch) are:

Pin 1 CD
Pin 2 RS-232 In
Pin 3 Ground
Pin 4 RS-232 Out

To make the four-wire cable, connect Pin 1 to Pin 1 on the DB25, Pin 2 to Pin 2 on the DB25, Pin 3 to Pin 7 on the DB25, and Pin 4 to Pin 3 on the DB25. On the DB25 end, also wire pins 4, 5 and 8 together and wire pins 6 and 20 together. There are many communications programs for the CoCo. *Mikeyterm* is available in both tape and disk versions and supports 80 columns on the CoCo 3.

Scattered Pokes and Patches

Recently I bought the program ED-TASM+ *and would like to switch it over to disk but find that the pokes and patches necessary seem to be scattered over a number of different* RAINBOW *issues that I unfortunately don't have. I wonder if you could reprint those pokes with detailed instructions on how to implement them. Having a CoCo 3, I would also like to use the patch for an 80-column screen in your column of January '88 by Roger Krupski, providing it is compatible with* EDTASM+ *as well as* Disk EDTASM.

Also, in trying to copy the program `TPTODSK` *in the February '87 issue, Page 73, using* EDTASM+, *I get a missing operand error in Line 277, which is a routine for checking for the version (either 1.0 or 1.1) of ROM. Because of the CoCo 3 version I suspect this may be the problem. Being a novice in assembly language, I wonder if you could suggest a way around this if you also believe it may be the cause.*

M. Hooper
Ontario

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

℞ When the CoCo 3 copies the ROM code to RAM on boot up, one of the things it does is change the 1 on the sign-on screen of the Disk BASIC ROM 1.0 or 1.1 to a 2. These are the only ROMs ever sold by Tandy. The patches you desire are too extensive for a column of this type. THE RAINBOW offers article reprints for $2 each, even if the magazine is out of print. RAINBOW-ON-TAPE/DISK is also available.

Out of Characters

I have a CoCo 3 with 512K, one DSDD drive, CM-8 monitor, a CGP-220 printer, OS-9 and Multi-Vue. *I also own an Amiga 500 with a VT100 emulation package. This setup works well and I have used it successfully with many host systems. My problem is that I cannot receive characters through the RS-232's port from the Amiga; the moment I type* `tsmon /t1`, *my CoCo aborts and responds to nothing except the* CLEAR *key, which still changes me between windows (if I have any open). I can output data at any speed (300 to 9600 Baud) with no problem by typing* `dir/t1`. *This works fine at any speed, but I read in the* Complete OS-9 Guide *that the terminals accessing OS-9 through the internal RS-232 port should have a baud of 300. I have tried it at 300 baud but it still doesn't work. If I type* `build afile </t1`, *the CoCo also stops. And when the CoCo stops, even on the previous command where only the input is redirected, periods are sent out the RS-232 and are displayed on the Amiga screen. All the above still happens even if I have no cable connected to the CoCo's RS-232 port. I have also tried this on my brother's CoCo 3 (128K) with the rest of the system configuration the same, with the same results. Is there a problem with my hardware setup, the serial driver or what? Also, I purchased* Multi-Vue *because it advertised that* Multi-Vue *can be used to create user-friendly interfaces for your developed programs, but after opening the package (and therefore voiding any chance of returning it), I find that this is not the case because there are no tools for creating ICONs. Can you suggest a way I can create my own "user-friendly" interface ICONs?*

Walter Zambotti
Perth, Australia

℞ The port `/t1` in OS-9 Level II is unsuitable for two-way communication since it accesses the CoCo 3's bit-banger serial port, which was designed for printers. To connect two computers for communication, you need a hardware serial port like the one supplied in Tandy's Deluxe RS-232 Pak or one of its clones. A number of mouse-based icon editors have been posted on the Delphi OS-9 SIG. To date, none of the authors have volunteered a deal whereby one can be purchased by mail.

Mods on Delphi

I own a CoCo 3, FD-500 disk drive and OS-9 Level II. I am planning to purchase an upgraded Multi-Pak interface and an Owl-Ware 3½-inch drive. Do you know where I could get a driver for the 3½-inch drive to run it under OS-9? Will OS-9 know if I have my FD-500 drive in one slot of the Multi-Pak and the other drive in another slot? How can I use my Radio Shack Speech/Sound Pak under OS-9?

Don Vaillancourt
Mississauga, Ontario

℞ A 720K 3½-inch drive is electrically equivalent to a 720K 80-track DSDD 5¼-inch drive, for which OS-9 Level II includes a device descriptor in the modules directory. Both 3½-inch drives and 5¼-inch drives can share a common controller, so only one Multi-Pak slot would be used. To enable a Speech/Sound Pak to work with OS-9 Level II requires replacement of one transistor. You will also need new software drivers. Both the drivers and the hardware mods are posted on Delphi. At the moment, I know of no other source.

Unfamiliar Codes

How can I send codes to my printer with OS-9 to tell my printer to print in condensed-character mode? It is very easy in BASIC. I tried to build a startup and a patch file with those codes, and OS-9 doesn't want to recognize the codes. What can I do?

Pierre Lortie
La Tugue, Quebec

℞ Use the `DISPLAY` command. For example, `DISPLAY` *xx xx xx* `>/P` would send the three hexadecimal codes *xx xx xx* to your printer.

CoCo del Artiste

Is there a paint set for the CoCo 2 that has a plug-in pen so that when you put it on your color monitor screen, it draws on the screen like drawing on paper without using the joystick or keyboard? Is there a program that would allow me to use a mouse to draw and save to tape in BASIC format? Can you use the text graphics (`CHR$`*, etc.) instead of the regular* `PMODE` *screen to enter in the CoCo Gallery contest entry?*

James Ruth
Newark, New Jersey

℞ While there were a few companies marketing light pens for the CoCo 1 and 2 a few years back, I know of no one doing so now. On a CoCo 1 or 2, simply `CSAVEM` the 6144 bytes from `&H600` to `&H1DFF` to tape to save a `PMODE3` or `4` screen. `CLOADM` can be used to restore a graphic to the screen.

DC to 1200

Is it possible to modify Radio Shack's DC Modem Pak to operate at 1200 baud?

William F. Irwin
Toledo, Ohio

℞ While nothing can be done with the built-in modem, some electronics hackers have managed to convert it to an RS-232 Pak via its ACIA. The resulting RS-232 Pak is then used with an external modem with baud rates up to 9600.

Using Telcom With *DeskMate*

Is there any way to use `Telecom` *in* Deskmate 3? *I also have OS-9 Level II. I am trying to use the I/O port in the back of my computer.*

Thomas R. Moody
Mt. Morris, Michigan

℞ The `/t1` device descriptor and associated device driver is unsuitable for two-way communication. The ways to use `Telecom` in *Deskmate 3* are either with `/t2` and a RS-232 Pak or with `/m1` and a Modem Pak.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` **for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.**

Using Syscall *to enhance* BASIC09

Tools for Programming BASIC09

By Philip Brown

It's time to overcome the great weakness of BASIC09 — we will pass variables both ways between simultaneously running programs. In the process, this article has become a tutorial in how to use `Syscall`.

While working this method out, I discovered an error in the Technical Section of Level II's manual: The function `SS.MpGPB` is not a function of `GetStt(syscall($8D))`, but a function of `SetStt`. Correct this before proceeding with this article's instructions.

Before we go any further, here's what `SS.MpGPB` does: It passes variables through what are commonly called `Get/Put` buffers, using the BASIC09 routine `Syscall`. What does that mean? Well, for starters, `Get/Put` buffers are areas in memory that OS-9 Level II usually uses for defining fonts and graphics pointers patterns and getting areas of a graphics screen. For example, with `Gfx2`, to use `GET` like the BASIC command `GET`, you have to give a group and buffer number. The group number can be anything from 1 to 199. The operating system itself uses the others. The group number puts aside an 8K block for your use, which you then have to give a buffer number. This buffer is a subdivision of that block. It can be any size, from one to two bytes, to almost the entire 8K.

The reason I say almost is because the system uses 32 bytes per buffer in the 8K block to define size.There are only sixty-four 8K blocks in 512K of memory. The system brings one into existence and permanently determines the size of the buffer(s) whenever you load a font, pattern or an area of a graphics screen. That means, if you want to store a greater amount of material, you have to kill the buffer (`Gfx2("killbuff")`) before attempting to get anything bigger. Alternately, you can define the size of the buffer before you start to do anything with `Gfx2("defbuff")`. Remember also that this is system-wide. If you continually do this and don't kill them afterwards, you will lose memory (8K block per group) without realizing it.

An alternate method is using `Display` with the codes listed in the windowing section in the Level II manual. Most of it is very comprehensible. For a detailed look at `Get/Put` buffers, read pages 3-

---

Philip Brown is 17 years old, and has been programming for seven years. He has learned LOGO and has taught himself OS-9 Level II, BASIC, BASIC09 and Assembly language.

7 to 3-8, `DfnGPBuf`(define `Get/Put` buffer).

Now the hard part — `Syscall`. `Syscall` is an incredibly useful function. I advise merging it with BASIC09, if you haven't already (then `attr basic09 E PE`). You can do things in Level II that you cannot do any other way. It calls for various OS-9 machine language subroutines, but don't worry: The procedure is simple once you understand it.

There are about 90 system calls listed in the technical reference under System Calls (Chapter 8). Most of them are too technical for easy use — two that can be used often are Get Status and Set Status (`GetStt` and `SetStt`). They are really a compilation of smaller subroutines, listed on pages 8-112 through 8-150. All these subroutines are listed with `SS.--`, the `--` being the actual name of the subroutine.

The line of demarcation between `GetStt` and `SetStt` routines is 8-131. As noted above, the subroutine `SS.MpGPB`(map `Get/Put` buffer) is on the wrong side of that line. When you are looking through them, it is important to note which side you are on because some of the function codes are the same but do different things under `GetStt` and `SetStt`. For instance, Function `#0` under `GetStt` reads 32 bytes of information from a "path descriptor," whereas Function `#0`, under `SetStt`, writes 32 bytes of information. Therefore, `SetStt` Function `#0` could crash a window, a disk drive, a hard drive, or the whole system. I lost count of the times I was experimenting, and suddenly the screen went haywire while everything locked up system-wide.

Get Status generally only reads the status of something, whereas Set Status changes it. So `SetStt` is the one to watch out for. As long as you are careful, you should be all right. But save everything you are working on at least once every half hour.

In using `Syscall`, first define a special variable type. `Syscall` is expecting information in that format. The standard way to use it, according to the section in BASIC09's manual is: `Type registers=cc,a,b,dp:byte; x,y,u: integer DIM regs:registers`.

The `cc,a,b . . .`, etc., stand for some of the different data registers in the 6809 chip. Once you have defined the variable type, load it with the data asked for by the system call you wish to make, e.g.: `regs.a=1\regs.b=$83`. How do you know what to put in? Here's a specific example (`F$SUser` Page 8-39, technical reference): If you want a user ID of 4, use:

```
regs.y=4
RUN Syscall($1c,regs)
```

The `$1C` tells `Syscall` to execute `F$SUser`. The `$1C` comes from `F$SUser 103f 1c` at the top of page 8-39. The `103f` is a machine language `SWI2` instruction you can ignore since you are using `Syscall`. After running `Syscall`, `regs.b` gives the code of any errors. `regs.cc` is the Condition Code register, which involves a knowledge of machine language.

To get to Get Status, or `I$GetStt` (page 8-54), requires a path number to be in Register A and the function code in Register B. Because of using `SS.MpGPB`, `regs.a` can be zero and `regs.b=$84`. Additional entry conditions are given by `SS.MpGPB` (Page 8-122): x must have the group number and buffer number of a G/P buffer, and y must have 1 or 0, telling whether we want to map or unmap. If mapping it, `regs.x` will have a memory location as the start of the buffer, and `regs.y` tells

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Rainbow Magazine called it **"A Must for Multi-Vue"**.If you have a 512K Color Computer 3 and use Level II OS-9 with Multi-Vue, you'll love our ***Deluxe Icon Editor.*** The Editor manages the application information file (AIF) and the bit mapped icon file - you simply design your icon by pointing and clicking on an enlarged grid which depicts the individual icon pixels. By clicking on the menu bar you can pull down a Files menu from which you can erase a file in memory, save the AIF and icon file to disk, load files from disk, or delete files on disk. The AIF section of the screen displays its eight elements alongside the map grid. Its contents can be changed by clicking on the element and typing in the new information via a dialogue window. All the elements are provided with error trapping routines for early detection of fatal errors. Price $10 95.

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I&CS is offered at a special rate of only $8.95. Reviewer Ted Paul called it **"a steal at this price ... one of the most interesting programs I've seen from a third party vendor ... a fine example of what third party vendors can produce to take advantage of the CoCo's graphics abilities in conjunction with the OS9 Operating System."** Computer Shopper, 11/88

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how long it is. You can then poke it to your heart's content.

In mapping the system makes a copy of the actual buffer into an area your program can access. Then whatever you do to that area will be done to the original until you unmap it.

This sample program is simple, its purpose being only to show that the method works. The "core" either prints, modifies and prints, or just modifies the appropriate buffer. This procedure is ideal for forking one main program with another and exchanging data. `Shell basic09 prog(#)&` is one way, where `#` is the group buffer number and `prog` is a packed program in the execution directory.

As a reminder, the workhorse for these programs is `SS.MpGPB`, of `SetStt`. The value of `regs.x` before the call is the group number (anything from 1 to 200) `*256 +`, the actual buffer number. After the call, the value of `regs.x` tells where the buffer has been copied to. You can then peek and poke those locations freely.

An interesting point on how powerful the procedure is as a tool is that after I perfected this method, I came across a reference stating that the system itself uses Buffer Group #0 to keep track of error messages (you cannot map the same buffer into the user space twice). This means that if the program has an error in the middle, you have to run `unmap` before trying it again. Then `run kill_buff` when you've finished with the buffer (8K).

And now directions to the most powerful BASIC09 programming tool since `Syscall`:

Given are two listings, `Core` and `Start`. Type very carefully to avoid a total system crash of OS-9. Rebooting is a pain, so if you can spare the memory, keep the main `/term` window running to get out of minor messes and operate from windows 1 and 2. Forget about compiling your pet program at the same time, though.

First merge BASIC09, `Syscall` and `Gfx2` into one file, `attr e pe` the new file, and load it. `Gfx2` isn't strictly necessary using `Syscall`, but it makes things simpler. Type in the first listing, `Core`, and `save*` it. Then get back to the OS-9 level, build Listing 2, and start and execute it (or type it in directly). Get into BASIC09 and load `Core`. Then clear and load it on Window 1. Run `def_buff`. Next, edit `Core` until it becomes `Core 2`. This involves deleting the line with `run mod_buff`. You can do it on the other window since the buffer can be modified by either program. Now run `Core` on both windows. The one without the `run mod_buff` is now subordinate because all it does is simply read the other's information.

Switch to the one you left alone, and pause it. The numbers on the other window will not change because the `mod_buff` program has been paused on the dominant window. If you want, retype the line you erased in the subordinate window and delete it in the dominant window, then run both. The flow of information is reversed, but it doesn't have to be just one way. You can have each work on its own separate part of the buffer. Each can have different buffer numbers to work on, also but with the same group number.

This may sound like a lot of trouble, but it's not. Once going, it will never screw up again unless something else uses the same group and buffer number. A way around this is to use the original process's ID number for a group number using `Syscall`, although it's

Listing 1: `CORE`

```
PROCEDURE Core
 0000      SHELL "tmode -pause"
 0010 1    RUN print_buff
 0017      RUN mod_buff
 001B      PRINT
 001D      GOTO 1
 0021      END
PROCEDURE mod_buff
 0000      DIM r:BYTE
 0007      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 002C      DIM regs:registers
 0035      DIM d:INTEGER
 003C      regs.a=0
 0047      regs.y=1
 0052      regs.b=$84
 005E      regs.x=25601 \REM group 100,buffer #1
 0080      (* map buffer
 008D      RUN syscall($8E,regs)
 009B      IF regs.y=1 THEN
 00AA        PRINT "error with syscall"
 00C0        PRINT regs.b
 00C8        PAUSE
 00CA      ENDIF
 00CC      FOR d=0 TO 9
 00DC        r=INT(RND(99))
 00E7        POKE regs.x+d,r
 00F7      NEXT d
 0102      PRINT
 0104      regs.y=0
 010F      regs.x=25601 \REM group 100,buffer #1
 0131      (* Unmap
 0139      RUN syscall($8E,regs)
 0147      END
PROCEDURE def_buff
 0000      RUN gfx2("defbuff",100,1,10)
 0018      (* define buffer as 10 bytes long
 0039      RUN gfx2("get",100,1,1,1,1,10)
 0056      END
PROCEDURE print_buff
 0000      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0025      DIM regs:registers
 002E      DIM d:INTEGER
 0035      regs.a=0
 0040      regs.b=$84
 004C       regs.x=25601 \REM group 100,buffer #1
 006E       regs.y=1
 0079       RUN syscall($8E,regs)
 0087       (* if it has worked, y=10;length of buffer
 00B1       IF regs.y=1 THEN
 00C0         PRINT "error with syscall"
 00D6         PRINT regs.b
 00DE         PAUSE
 00E0       ENDIF
 00E2 1     FOR d=0 TO 9
 00F5         PRINT PEEK(regs.x+d);
 0103       NEXT d
 010E       PRINT
 0110       regs.y=0
 011B       regs.x=25601
 0127       RUN syscall($8E,regs)
 0135       END
PROCEDURE kill_buff
 0000       RUN gfx2("killbuff",100,1)
 0016       END
PROCEDURE unmap
 0000       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0025       DIM regs:registers
 002E       regs.a=0
 0039       regs.b=$84
 0045       regs.y=0
 0050       regs.x=25601
 005C       RUN syscall($8E,regs)
 006A       END
```

rather complex. You can get it with the information you have learned involving `Syscall`. (`F$ID`, Page 8-22). `RUN Syscall($0C,regs)` will get it in `regs.a`.

The applications are limitless. I'm going to use it in a game to keep the character-handling routines separate from the monsters, so the player doesn't slow down when a lot of monsters are on the screen. Another use is for a split-screen or multiterminal, real-time game so you don't have to wait while your opponent refuels or whatever. The buffer can be any length (to a little under 8K). It's a whole new super variable type. Work with it carefully, until the basics are down. See what you can come up with.

(Questions or comments concerning this article may be directed to the author at 199 Devon Drive, San Rafael, CA 94903. Please include an SASE when requesting a reply.) ☐

Listing 2: START

```
iniz w1
echo Hi>/w1
basic09<>>>/w1&
```

MLBASIC 2.0 - BASIC Compiler

If you want your BASIC programs to run up to 50 times faster, or want more programming features without learning another language, MLBASIC is for you.

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MLBASIC revision 2.0 has incorporated all enhancements that were suggested by MLBASIC 1.0 users and more. Revision 2.0 did away with all the incompatibility problems that existed with revision 1.0.

MLBASIC allows for the first time user to quickly compile a program using default compiler settings. The advanced user has the capability of controlling over a dozen settings which control where the program is compiled, which medium to compile to (memory or disk), string space, compiler listings and more.

With all this going for MLBASIC, your might expect the cost to be a little out of your budget. After looking at prices of other BASIC compilers for the COCO 3 you might be correct. But look again at this ad; for only $59.95, you can have a programming language that will spark your interest once again in the COCO.

Before you buy another BASIC compiler for the COCO, find out if it supports everything MLBASIC supports. Then look at the price tag. We feel that it won't be long before you place an order for MLBASIC.

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COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

That's One Great Chip!

I have an old Multi-Pak (Cat No. 26-3024) and the upgrade PAL chip for it. I also own both CoCo 1s and 3s. Can I upgrade the Multi-Pak in such a fashion that it will work with both the older and the newer Color Computers that I own?

Also, can you tell me what the jumpers on a Tandon TM-100 series drive do, so I can set them to use the drive with my CoCo?

David Johnstone
Torrington, Connecticut

After you install the upgrade PAL chip in your Multi-Pak, it will work fine with the RS-232 pak, disk controller, and all other *currently sold* cards that plug into the Multi-Pak, regardless of what model CoCo you have. However, if you want to use *CoCo Max II*, the old PBJ Word Pak Model I or II, or other older pieces of hardware, you need to buy a PAL switcher from Microcom to allow you to switch back to the older PAL chip.

As far as the jumpers on a Tandon TM-100, its 16-pin socket for drive select jumpers has an assignment of pins to functions as follows:

1 --- 16 HS (not used).
2 --- 15 Drive Select 0.
3 --- 14 Drive Select 1.
4 --- 13 Drive Select 2.
5 --- 12 Drive Select 3.
6 --- 11 Multiplex (don't use).
7 --- 10 Spare (don't use).
8 --- 9 HM (not used).

Only a single jumper in the correct drive select position is needed to make the drive work with a CoCo. Of course, you must also have one and *only one* terminator resistor pak in your drive system. That is, the *other* socket on the drive must have a terminator resistor pak in it if none of the other drives on that cable have one, *or* (if you are adding the drive to a system that already has drives on it) you must *remove* the terminator resistor pak from the other socket before adding the drive to the system.

Mount Fujitsu

Where can I get the screws used to mount Fujitsu half-height drives in an FD-501 case?

Scott McCall
Jacksonville, Florida

You need to specify what *kind* of screws are required. I will assume that the particular drive you are asking about uses metric screws, probably standard 3 millimeter type. Any decent hardware store stocks various sizes of metric screws.

As an alternative, you can use a tap to convert the holes in the drive which makes it possible to use American SAE type 6-32 screws.

Keep Plugging Away

I'm tired of plugging and unplugging ROM paks from my disk-based Color Computer. How can I copy them to disk and run them off my disk system?

Geoff Hall
Casselberry, Florida

I have been asked this question literally hundreds of times. I have also helped fix literally dozens of computers that were burned out by folks who carelessly unplugged a disk controller or ROM pak while the power was on. So your question is certainly a pressing and legitimate one. The other side of the coin is that makers of ROM paks want to discourage privacy, and so use the fact that their program is in a ROM to try to physically prevent making copies. This is especially true of the most recent releases of ROM pak game software from Tandy, which tend to be heavily protected against running a RAM environment. The older ROM paks can be copied to and run from disk using a program called *Multi-Pak Crack*, plus added patches. The program may be available from Microcom or Second City Software. But the new version of the program cannot be effectively copied to and run from the disk.

Phone Home CoCo

I need to know the addresses used by various CoCo hardware paks to aid me in choosing an address for a hardware project.

Winston Pike
Escanaba, Michigan

Currently I don't have a complete updated table of such addresses. The information is constantly changing as new paks are added and others become obsolete. I suggest making the project in such a way that you can, by moving jumpers or changing trace cuts, re-address the project's ports to accommodate a range of two or three ports. You can also design the device to use the SCS line to decode its addresses, placing it in the $FF50 to $FF5F range. This requires using a slot-dependent device with a Multi-Pak.

Consider whether or not the project is likely to be used on a system with, say, a Speech/Sound pak. If not, then don't worry about address conflicts. A partial list of addresses used by popularly available paks is as follows:

$FF60 — $FF63	Tandy X-Pad (obsolete and rare . . . consider that space available!).
$FF64 — $FF67	Free (?).

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's *CoCo SIG and database manager of OS-9 Online.*

$FF68 — $FF6B	Tandy and other RS-232 paks *(Do not use)*.
$FF6B — $FF6F	Tandy DC Modem Pak and some third party RS-232 Pak second ports. (Do not use.)
$FF70 — $FF73	Speech Systems stereo pak.
$FF74 — $FF77	Owl-Ware, L&R Tech, RGB and Ken-Ton hard drive system ports, and Speech Systems SC-01 voice pak.
$FF78 — $FF7B	Speech System's EARS.
$FF7A,B	Orchestra 90.
$FF7D,E	Radio Shack Speech/Sound Pak.

Note that Disto's Mini Expansion Bus uses addressing in the range of $FF50 through $FF5F. Hope this helps!

Who Are Those Guys?

How do I save to disk pictures I have made on the Hi-Res Screen of the CoCo 3? And who are those guys that pop up on the Coco 3 screen when I hit CONTROL-ALT-RESET?

Eric Pike
Gun Lake, Michigan

BASIC on the CoCo 3 does not provide any means of saving Hi-Res screens. You need to write, download from Delphi or buy utility programs to help you with this. *Those guys* who pop up on the screen during cold starts wrote the patches to the old CoCo BASIC to make it work on the CoCo 3. Delphi users call them the *Three Mugateers*, among other things.

The story goes that a group of programmers put the picture in without Tandy knowing it until moments before the ROM was mass produced. Faced with the choice of either further delaying the release of CoCo 3 or leaving it in, Tandy chose to leave it in. The picture takes up a full 6K of space in the CoCo 3's Extended BASIC ROM, which is more than enough space for saving Hi-Res picture screens, a full screen editor in BASIC, and much more. Instead, we have a not-so-lovely picture.

An Ideal Picture

I'm thinking of marketing a product and service that will allow users to customize their CoCo 3 BASIC ROM by having their picture (not that of Microware) appear on the screen when they hit CONTROL - ALT - RESET. However, as you know, this involves replacing the 28-pin ROM chip in the CoCo, which is soldered into the CoCo 3 circuit board. Is there any way to disable the chip without actually removing the mother board and desoldering the chip?

David Barnes
Second City Software
Chicago, Illinois

Yes! All you need do is have your customer clip Pin 20 of the ROM on the CoCo and solder to the stump of the pin as it enters the chip, a 1K pull-up resistor that goes to +5 volts. That will disable the ROM in the CoCo. Then, you simply piggy-back on the new EPROM, and carefully wire the pad previously used with Pin 20 of the old ROM to Pin 20 of the new one, which you have bent out. Now, while doing this is much easier and safer than desoldering the entire ROM chip, the task can still be difficult for some people. Good Luck!

A Printer of a Different Color

I have a Quadjet QJ-9000 color printer, which is similar to the Canon PJ-1080a and CGP-220 printer. But its colors appear to be set differently from the way the colors are set using the CGP-220. Can I set its DIP switches to make it work like a CGP-220?

John H. Opheim
Burlington, Kansas

There were almost a dozen varient printers made around the Canon four-color-ink jet printer mechanism. Unfortunately, all of them use slightly different on-board ROM software, and the codes for setting colors varies significantly among different printers in that family. You need to experiment with the codes to find correct ones for your printer. As for setting DIP switches, I have no way of knowing without the documentation for that printer. Do you have it?

Switching Switches Not Good

I am having trouble using a ROM switcher on DOS ROM chips. Is there a difference between Color BASIC and DOS ROMs?

Robert Vernon
College Station, Texas

The 24-pin ROMs used in older CoCo 1s and 2s and in all disk controllers up until the FD-502 controller system are electrically the same. These are 8K-by-8 chips compatible with the (now no longer made) Motorola 67866 and 68764 EPROMs. The 28-pin ROM used in the later model CoCo 2s and current CoCo 3s are electrically different. Actually, making a ROM switcher that switches between two different ROMs is not a good idea. Today, with 16K-by-8, 32K-by-8 and 64K-by-8 EPROMs so inexpensive and widely available, the best way to switch between two varient ROMs is to burn them into the same bigger EPROM, then send +5v or ground the high order address lines in a way that appropriately selects which 8K, 16K or 32K band on the ROM will be active. This approach costs less, takes up less space and uses less power. Old physical ROM switchers are now obsolete, previously used when big size EPROMs were either unavailable or too expensive.

Add, Supply and Remove

How can I use an IBM disk drive on my Color Computer?

Ron Cank
Missouri City, Texas

With a 180K or 360K type drive, an IBM disk drive works easily on a Color Computer. A 720K or 1.2 megabyte drive, however, would probably not work.

To add the drive to your existing cable, merely add a connector to the cable, and supply the drive with its required power (+5 volts at .3 amps and +12 volts at .6 amps) from any appropriate power supply. Also, be sure to remove the terminator resistor from the drive (if it has one) and select the jumpers to indicate what drive number you want. IBM's are used as Drive 1 by most CoCo users.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` **(for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.**

Learn to share . . .

Chown

By Evan Robinson

The program *Chown* was modeled after a program on an Altos UNIX System V machine. It provides a way of giving other users on your system files. I found the need to write this when a number of my users wanted ownership to some test files I had downloaded from systems they had no accounts on (primarily because the boards I called were long-distance).

What this program does is simple. When you execute it, it searches the `argv` vector for two strings. If not found, the usage form is displayed. After this, it converts the User ID supplied in the first argument to an integer via the `atoi()` function. Then it passes the filename and new User ID to the `chown()` call. If an error is detected for any reason (the file is a directory file or cannot be accessed), it aborts with a message.

The only real problems I have encountered is that only the superuser of the system (UID 0) can change ownership. Not a big problem, but it does differentiate from the UNIX equivalent that allows user-to-user chowning.

I recently received as gifts both OS-9 and a disk drive. I upgraded the system with a second drive and was given my own telephone line (I made so many modem calls, my mom went crazy.). Now I am running a time sharing system. It's amazing how well a 6809 can handle concurrent processes. Give it a call if you have the time. The number is: (407)/686-4833. Login: `'GUEST'` (no password). I started using UNIX in June and must say it is great.

For avid OS-9 users, *Chown* makes adaptation beautiful.

(Questions or comments concerning this article may be directed to the author at 1931 Embassy Drive, West Palm Beach, FL 33401. Please enclose an SASE when requesting a reply.) ☐

Evan Robinson is a 12-year-old, self-taught programmer who attended Duke University's program for verbally- and mathematically-gifted youth.

The Listing: Chown

```
  /*******************************************************************/
/*                                                                */
/*     Chown - Change Ownership of OS-9 Files (Not Directories)   */
/*      Modeled after the UNIX equivalent ; UNIX-TM(AT&T)         */
/*          OS9:chown UID FILESPEC                                */
/*                                                                */
/*   Compile with the Microware C Compiler: CC1 chown.c           */
/*                                                                */
/*   Submitted by:                                                */
/*                Evan Robinson                                   */
/*                1931 Embassy Drive                              */
/*                West Palm Beach, FL 33401                       */
/*****************************************************************/
#include <stdio.h>
main(argc,argv)
int argc;
char *argv[];
    {
             char *fname;
             int     uid;

             if (--argc != 2) {
                                    help();
                                    exit(0);
                                 }
             uid = atoi(argv[1]);
             fname = argv[2];
             if (chown(fname,uid) != 0) {
                                        error("chown: Can't access given file");
                                        exit(0);
                                        }
             exit(0);
    }
help()

    {
          puts("Usage:\n");
          puts("      chown UID FILE");
          puts("Makes UID owner of FILE");
    }
```

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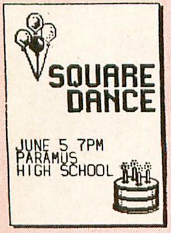
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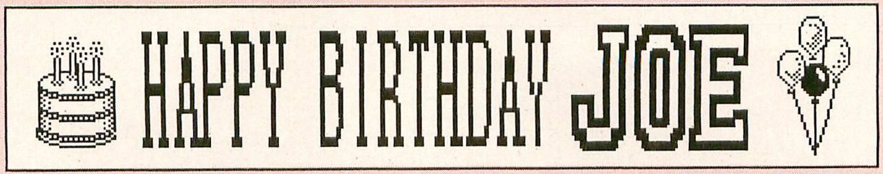
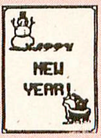

HAPPY BIRTHDAY JOE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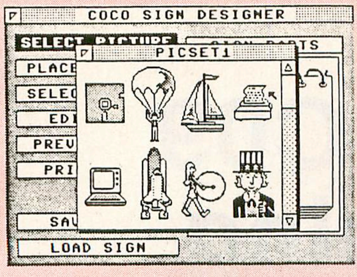
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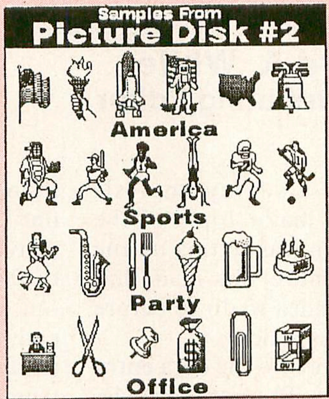
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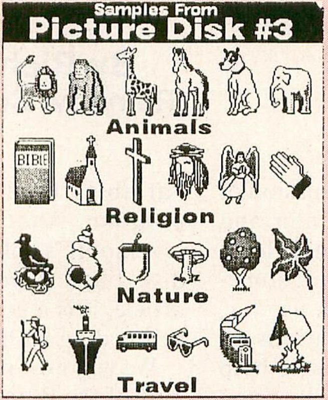
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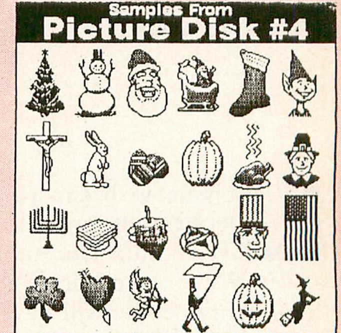
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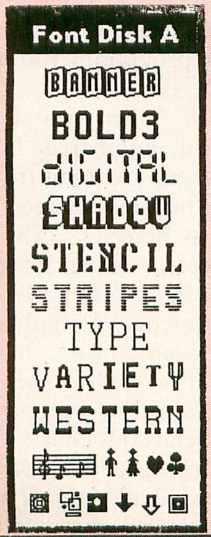
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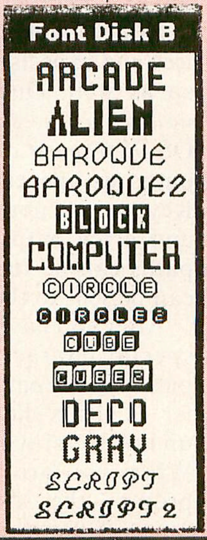
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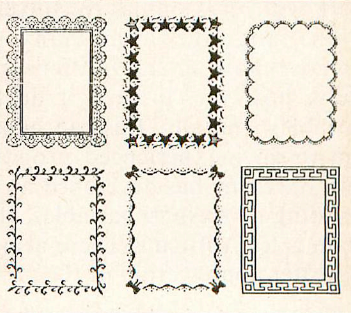

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Accessible Applications

More BASIC09 Programming

By Richard A. White
Rainbow Contributing Editor

Last issue, we began a discussion of a BASIC09 program to enter and analyze data from a small local survey. While the program is not something many people will have a use for, it does provide good illustrations of BASIC09 programming that will help people to write their own. Whether you use a programming language, spreadsheet program, a database manager or some more specialized piece of software, you need to give the computer exact details of what you want to do. This is programming.

For a general programming language, BASIC09 is particularly easy to work with. It is similar to conventional BASIC languages that many people already know. BASIC09 differs substantially, however, in how it deals with variables. Initially, this can be a problem to an inexperienced programmer. But, once one has developed an understanding of BASIC09 variables, the program is less difficult. There also comes a greater appreciation of the program's power.

Accordingly, a substantial portion of last month's column discussed defining variables used in a survey analysis program. Another major topic of the last month's column was setting up the disk files. If you have not read that article, it is a good idea to do so before proceeding with this article.

We will now move into the data entry part of the program. To reset the stage, I have 350 of 3500 survey response forms. Each form has a dozen items, one or more of which can be checked.

The simplest way from a programming standpoint is to write a series of `INPUT` statements, each of which asks a "yes" or "no" question. One problem is that I need to read each one each time to stay synchronized in choosing an appropriate keystroke.

Another is that this approach does not provide for corrections after a question is answered. The input screen has a menu showing each possible choice. A pointer can be moved up or down with the arrow keys. Choices are selected by moving the pointer and pressing ENTER.

```
REPEAT
(* Input Screen *)


PRINT CHR$(12);
SHELL "tmode .1 echo"
SHELL "tmode .1 -pause"
```

Since the data-entry process takes quite a bit of time, the program needs to loop through the code for each form until it receives a signal to quit. BASIC09 provides a number of control structures to facilitate this. `REPEAT..UNTIL` serves our purposes best. When it gets to the end, the *condition* is tested and, if true, the loop is exited. If the condition is not true, program control is returned to the line below the `REPEAT`.

BASIC09 does not have a `Cls` command like Color BASIC. ASCII Character 12, at the top of the form, starts a new page on a printer, but also clears the screen and puts the cursor at the upper left corner.

BASIC09 makes full use of OS-9 services and expects the programmer to do so as well. One of these services is *writing to the screen.* When you boot OS-9, three standard, numbered, I/O paths are opened. These are input from Keyboard 0, normal output to Screen 1, and error output to Screen 2. These paths can be redirected so that errors can be sent to the printer or to a file.

After you have booted, OS-9 handles special characters sent along these paths. For example, the ASCII Character 12 clears the screen. The keyboard up arrow normally sends this character. When you are working at the OS-9 prompt, the ASCII 12 is trapped by `Shell` if you press the up arrow, and OS-9 displays a period instead. When you are in a BASIC09 program, `Shell` is not in use, and OS-9 will normally send

---

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the co-author of the TIMS *database management program.*

or `echo` all keystroke characters to the screen and program.

Sometimes there is a problem with this. Say, I want to move the up arrow up one line. If I don't do something when I press the up arrow, OS-9 clears the screen and the program prints the cursor at a line that has been erased. BASIC09 can send a message to OS-9 to turn the `echo` off so when I press the up arrow, the ASCII 12 character goes only to the program that does my bidding. This is fine until, for instance, I type in a ZIP code and want to see what I am typing. If `echo` is off, turn it back on by typing `shell "tmode .1 -echo"`. This line is in the program just before I start to use the arrow keys to move the cursor. Now when the program loops back for the next form's data, `echo` is off so I add `shell "tmode .1 echo"` to turn it back on for the ZIP code entry.

OS-9 also prints the screen in pages and then stops for you to read what was printed. When you press a key, OS-9 continues with the next page. This feature is called *pause*. You can set this to however many lines you want using `Xmode` and then immediately make a new boot using `Cobbler`. The settings in your computer will be the settings when you boot again using the new boot disk. To manage paging with the program instead of OS-9, `shell "tmode .1 -pause"` turns pause off. Note that under Level II, `Tmode` only affects the window where it is used and not other active or future windows.

```
PRINT
PRINT TAB(10); "CINCINNATI DIVISION
SHOW SURVEY"
PRINT TAB(15); "FILENAME "; fname
PRINT
PRINT
PRINT
PRINT TAB(15); c(1)
PRINT TAB(15); c(2)
PRINT TAB(15); c(3)
PRINT TAB(15); c(4)
PRINT TAB(15); c(5)
PRINT TAB(15); c(6)
PRINT TAB(15); c(7)
PRINT TAB(15); c(8)
PRINT
PRINT TAB(15); c(10)
PRINT TAB(15); c(11)
PRINT TAB(15); c(12)
PRINT TAB(15); c(13)
```

This section of code prints our screen to look like a menu. In last month's column, I explained setting up an array of strings, `DIM c(13):STRING[20]`, and showed assigning text to each array member. Here we use that array to print the menu entries. I assume that most of you have used `PRINT TAB(xx)` under Color BASIC. It works the same under BASIC09.

```
PRINT
PRINT TAB(20); "Q to Quit"
PRINT
PRINT TAB(15); "QUESTIONNAIRES EN-
TERED = "; count1
```

As a reminder, quit by pressing the Q key. Printing `"QUESTIONNAIRE ENTERED = ";count1` is like Color BASIC except the delimiter, ;, between the string and variable is required, where it is optional in Color BASIC. If you forget, BASIC09 will remind you when you try to enter a line with this error in it.

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About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

```
RUN printat(15,4)
count1=count1+1
INPUT "ZIP CODE: ",zip(count1)
```

`Printat` is a separate function that moves the cursor to a specific column and row in other columns. The `INPUT` statement is conventional. You can use , or ; for the delimiter.

```
RUN printat(9,6)
PRINT ">;"
```

With the ZIP code entered, you can now enter the other data. The > is printed pointing to the top choice on the list.

```
(* Data Input *)

SHELL "tmode .1 -echo"
row=6
flag=1
```

Now the `echo` is turned off so we avoid the `CHR$(12)` screen-clearing problem. You will see why we set `flag=1` after the next code block.

```
WHILE flag=1 OR answer<>CHR$(13) DO
  GET #0,answer
  RUN isupper(answer)
```

This loop cycles back until all choices have been made. Since `WHILE..DO` tests for specified condition at its beginning, I set `flag=1` to assure entry, though on checking back I see the answer must be either I or L to have gotten this far. These things happen in quickly written programs where sometimes things are done locally to ensure power that may not be needed.

The command `GET #0` works better than `INKEY`. It waits for a keystroke rather than making the programmer write a loop to keep checking for input. In this case, the answer was `DIM`ensioned as `STRING[1]`, so any keystroke, including `ENTER`, satisfies `GET` and allows the program to move on. If the answer had been `DIM`ensioned for more than one character, you would have needed to either enter the number of characters or press `ENTER` to terminate the entry.

The keystroke Q can be entered to terminate data entry. This can come in lowercase so `isupper (answer)` is run to promote the character to caps if needed.

```
(* MOVE CURSOR UP *)
IF answer=CHR$(12) THEN
  IF row>6 THEN
    RUN printat(9,row)
    PRINT " ";
    row=row-1
    RUN printat(9,row)
    PRINT ">;"
    flag=1
  ENDIF
```

When you key an up arrow, the first `IF..THEN` statement is satisfied and the cursor-up routine is entered. If the cursor is positioned below Row 6, there is room to move up and the second `IF..THEN` statement is satisfied. The program then erases the cursor on the screen by printing a space on top of it and printing a new one on the row above. The flag is set to 1 to show that the last operation was a cursor move rather that a selection of a list item. Note that if the cursor is pointing to the top list entry, nothing happens.

```
  (* JUMP EMPTY ROW *)
  IF row=14 THEN
    RUN printat(9,row)
    PRINT " ";
    row=row-1
    RUN printat(9,row)
    PRINT ">;"
  ENDIF
ENDIF
```

We have to deal with a blank line in the list separating two types of data. If the cursor is moved to Line 14, the blank, this code simply moves it up to Line 13. The flag has already been set to get to Line 14 so it does not need to be reset. The final `ENDIF` statement terminates the cursor-up code.

```
(* MOVE CURSOR DOWN *)
IF answer=CHR$(10) THEN
  IF row<18 THEN
    RUN printat(9,row)
    PRINT " ";
    row=row+1
    RUN printat(9,row)
    PRINT ">;"
    flag=1
  ENDIF

  (* JUMP EMPTY ROW DOWN *)
  IF row=14 THEN
    RUN printat(9,row)
    PRINT " ";
    row=row+1
    RUN printat(9,row)
    PRINT ">;"
  ENDIF
ENDIF
```

The cursor-down code almost mirrors the cursor-up code.

```
(* RESET FLAG FOR ADDED SELECTION
*)
IF flag=0 AND answer<>CHR$(13)
THEN
   flag=1
ENDIF
```

A situation can occur where the cursor is at the top or bottom of the list, and the user presses the arrow that moves the cursor beyond the list. In this case nothing happens, and the flag is not set to 1. The code above assumes the user wants to make another choice and sets the flag so that pressing ENTER will not terminate data input.

```
(* ADD SELECTION TO RECORD *)
IF flag=1 AND answer=CHR$(13) THEN
  ON row-5 GOSUB 6,7,8,9,10,11,12,
  13,14,15,16,17,18
  flag=0
  answer=""
  rec(count1).ar=1
ENDIF
```

To select or deselect a choice, move the cursor to the choice and press ENTER. Moving the cursor sets the flag to 1 and ENTER lets the program enter the code piece.

`ON X GOSUB` uses the value in `X` to count to a line number right of the `GOSUB` and then sends the program to that line. Counting starts with 1, while the first entry on the list is in Row 6. Subtracting 5 from the row gives us the needed item number in the list.

The line-numbered subroutines follow the `END` statement. Now the program can never get to them except by being specifically sent by a `GOSUB` or `GOTO`. Lines 13 and 14 are given as an example:

```
13 RUN printat(11,row)
IF rec(count1).oth=0 THEN
  rec(count1).oth=1
  PRINT "O;"
ELSE
  rec(count1).oth=0
  PRINT " ";
ENDIF
RUN printat(9,row)
RETURN
14 RETURN
```

> **“A data selection subroutine must deal with both selection and deselection of a specific data point. The process is essentially binary for this program since the respondent either checks or does not check the item.”**

A data selection subroutine must deal with both selection and deselection of a specific data point. The process is essentially binary for this program since the respondent either checks or does not check the item. Also, a mark next to the item on the screen shows it was selected.

The `printat` process is run to locate the cursor for marking or unmarking. Next, the variable in the record pertaining to this choice, `rec(count1).oth`, is checked to see if it is zero (not selected). In that case, `rec(count1).oth` is set to 1, indicating selection, and an O is printed to mark selection on the screen. If the item had been previously selected, the code after `ELSE` would be used to deselect the item and remove the selection mark from the screen. The `printat(9,row)` moves the cursor back where it was before the subroutine was entered.

Remember that *Line 14* was blank. If you accidentally select it, simply press ENTER.

```
EXITIF answer="Q'' THEN
ENDEXIT
ENDWHILE UNTIL answer="Q"
```

Right now the program sits at the end of a `WHILE..DO..ENDWHILE` loop that is inside a `REPEAT..UNTIL` loop. Each time entry of a survey form's data is complete, the program exits the `WHILE` loop since `flag=0` and `answer=CHR$(13)`, but it jumps right in to start the next form. Q to quit is not part of the loop exit conditions, but we can add this with the statement `EXITIF..THEN..ENDEXIT`. This is simply a special `IF..THEN..ELSE..ENDIF` statement allowing the programmer certain actions only when exiting a loop and then getting out. When `answer="Q"` and the `WHILE` loop are exited, the conditions are met to leave the `REPEAT..UNTIL` loop exited as well.

```
(* SAVE RECORDS TO FILE *)
OPEN #path,fname:WRITE
PUT #path,rec
PUT #path,zip
CLOSE #path
```

Immediately on exit, the records are saved to a file and that file is closed.

Following this is the tabulation of data and a printed report of the results. I will not go into that now — you have enough to think about for one month.

OS9: SOFTWARE <D_P_Johnson >my_system >>no_errors #512K &

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Barden's Buffer

Simple CoCo interfacing for the all-thumbs CoCoNut

Devices, Unlimited

By William Barden, Jr.
Rainbow Contributing Editor

Stop! Don't turn that page! Even if you've never held a soldering iron, even if you don't know what a transistor looks like, I'm going to show you how to do some amazing things with your CoCo 1, 2 or 3. For under $20 and for about one hour's work, you'll be able to do these things (and more):

- Detect night and day
- Detect when room lights are turned on or off
- Measure wind direction
- Make a sensitive light meter
- Measure inside and outside temperature
- Count the customers coming through your shop's door
- Make a multi-circuit burglar alarm
- Make a water-level detector
- Sound an alarm when your mail is delivered

Does this sound like hype? It isn't. Does it sound as if you'll need a master's degree in electrical engineering? You won't. I'll show you how to do these things and more with little cost, no modifications to your CoCo, easy-to-obtain parts, no dangerous voltages and no experience whatsoever. Interested? Read on . . .

The Simplest CoCo Interface

To do these things on the CoCo, you will use the joystick inputs as a simple interface and use simple, low-cost switches and devices available at your local Radio Shack or other electronic parts store. There are two joystick inputs on every CoCo, whether you have a CoCo 1, 2 or 3. Normally they are meant to be used with joysticks for games or screen drawing programs. However, the inputs can be used for other purposes.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

You don't really need to know how the joysticks work to hook up some of the devices I'm going to show you, but let me give you a thumbnail sketch anyway. The joystick *internals* are shown in Figure 1.

It's a simple electrical device, consisting of two potentiometers and two switches.

The potentiometers are variable resistors that change a resistance value from about 0 to 100,000 ohms. Resistance is an electrical quantity similar to friction in a water pipe — increase the resistance and less current flows, just as less water flows in a hose when you squeeze it. When you manipulate the joystick control of your CoCo, the resistance of the two potentiometers are changed according to the joystick's position.

One potentiometer is affected by the up/down motion of the joystick while the other is affected by the left/right motion. The resistance values of both joysticks are read by the special circuitry within the CoCo. The resistance values are then read by the `JOYSTK` command in BASIC, which returns values of 0 to 63, representing resistance values of 0 to about 100,000 ohms. Here's a simple BASIC routine to read the right joystick:

```
100 A=JOYSTK(0)
110 B=JOYSTK(1)
140 PRINT A;B
150 GOTO 100
```

To see the results, enter `NEW`

Enter lines 100 through 150. Then enter `RUN`. You'll see two columns of values — A followed by B. The A value changes from 0 to 63 as the joystick is moved from left to right while B changes from 0 to 63 as the joystick is moved from top to bottom.

Of course, you have two joystick plugs on all CoCos. The

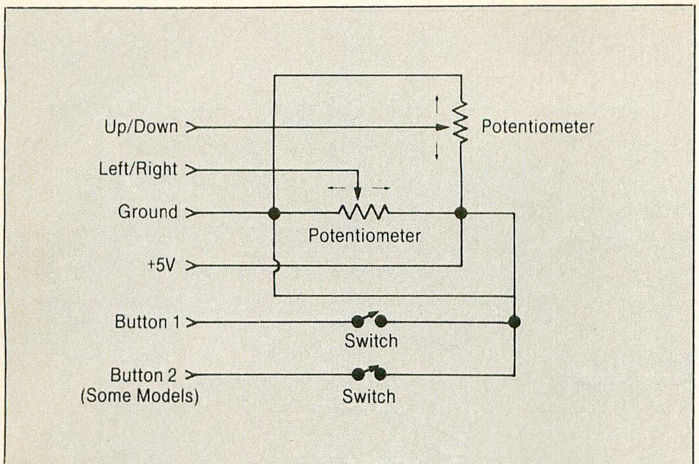


Figure 1: Joystick Diagram

`JOYSTK` command in BASIC also reads the left joystick in this manner:

```
100 A=JOYSTK(0)
110 B=JOYSTK(1)
120 C=JOYSTK(2)
130 D=JOYSTK(3)
140 PRINT A;B
150 GOTO 100
```

To see how this code works, enter lines 120 and 130 and enter `RUN`. You'll see four columns representing the two joysticks' X and Y values.

In addition to the movable lever on the joystick, there's also a button or two to zap alien invaders or to mark screen positions. This button is a simple, normally open switch. (See Figure 1.) *Normally open* means no connection is made while the switch is not pushed. When the switch is pushed, a connection is made, and the CoCo can detect the change.

CoCo 3's BASIC has a special command not found in the other CoCos that detects joystick-button pushes. Appropriately, it's called `BUTTON` and works like this:

```
200 E=BUTTON(0)
210 F=BUTTON(1)
220 G=BUTTON(2)
230 H=BUTTON(3)
240 PRINT E;F;G;H
250 GOTO 200
```

To see how this works, enter `OK` and `NEW` and then lines 200 through 250. Finally, enter `RUN` and you'll see 0 0 0 0 on the screen until you press buttons on the right or left joystick. Then you'll see the number 1 in the position corresponding to the joystick switch. The 1 will remain there until the button is released.

If you have a CoCo 1 or 2, use the following code to read the buttons on the right and left joysticks:

```
200 E=(PEEK(&HFF00) AND 1)
210 G=(PEEK(&HFF00) AND 2)
220 IF E=0 THEN PRINT 1; ELSE PRINT 0;
230 IF G=0 THEN PRINT 1 ELSE PRINT 0
240 GOTO 200
```

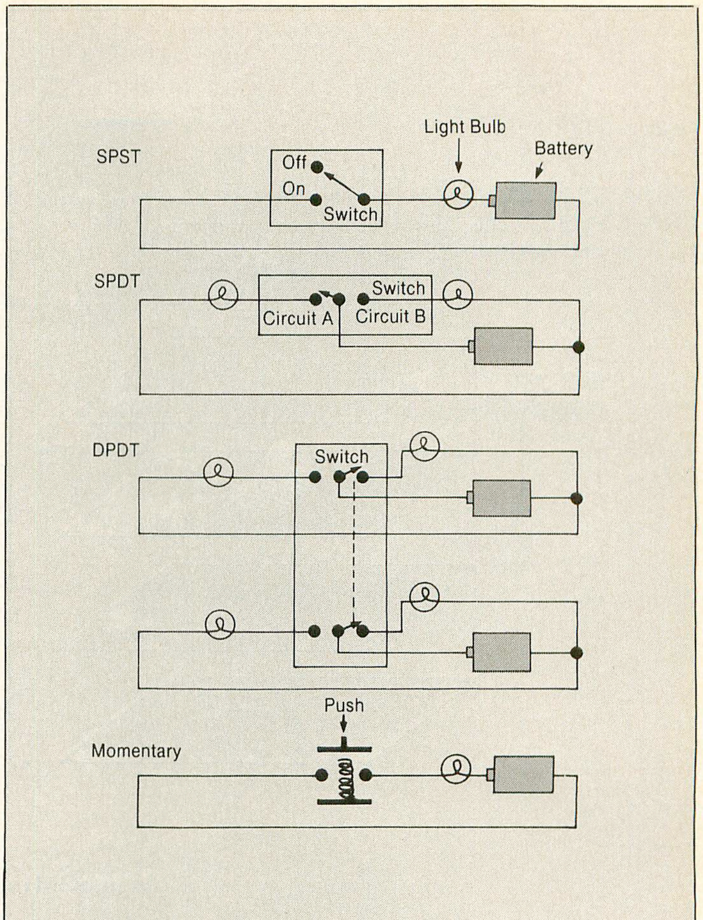


Figure 2: Switch Types

The code above goes further into the hardware to read the input bits for each joystick button since there isn't a `BUTTON` command in this BASIC. Here's the vital thing about the joystick ports on the CoCo: The CoCo doesn't really know whether it's reading an official joystick value or button push or if it's reading another resistance or switch. You can, for example, substitute a 0- to 100,000-ohm resistance value for one or both ports and any type of switch — even one located hundreds of feet away from the CoCo. The CoCo software will still return a value of 0 to 63 for the resistance and a 0 or 1 for the switch position — open or closed. Are there devices we can substitute for the official joysticks? You bet, and many will do wonderful things.

Substitute Switches

Let's talk about switches first. There's no reason you cannot hook two wires to the pins of the joystick plug and run them up to 50 feet away. When you touch them together, the CoCo will detect the switch closure. Bare wire will work, but there are all kinds of inexpensive switches available.

Figure 2 shows the simplest type of switch, called SPST (Single Pole, Single Throw). Once thrown, it remains in that position until thrown back the other way. A variation on this type is a momentary switch, which closes as long as your finger is on the button but opens when the switch is released. Momentary switches come in normally open and normally closed. For our purposes, normally open is probably best.

Another type of switch, the SPDT (Single Pole, Double Throw) is shown in Figure 2. This switch has two positions — A and B. It can be used the same way as the SPST by not connecting the other position. A DPDT switch uses another circuit enabled by the same mechanical switch. It's overkill for our purposes, but it can be used.

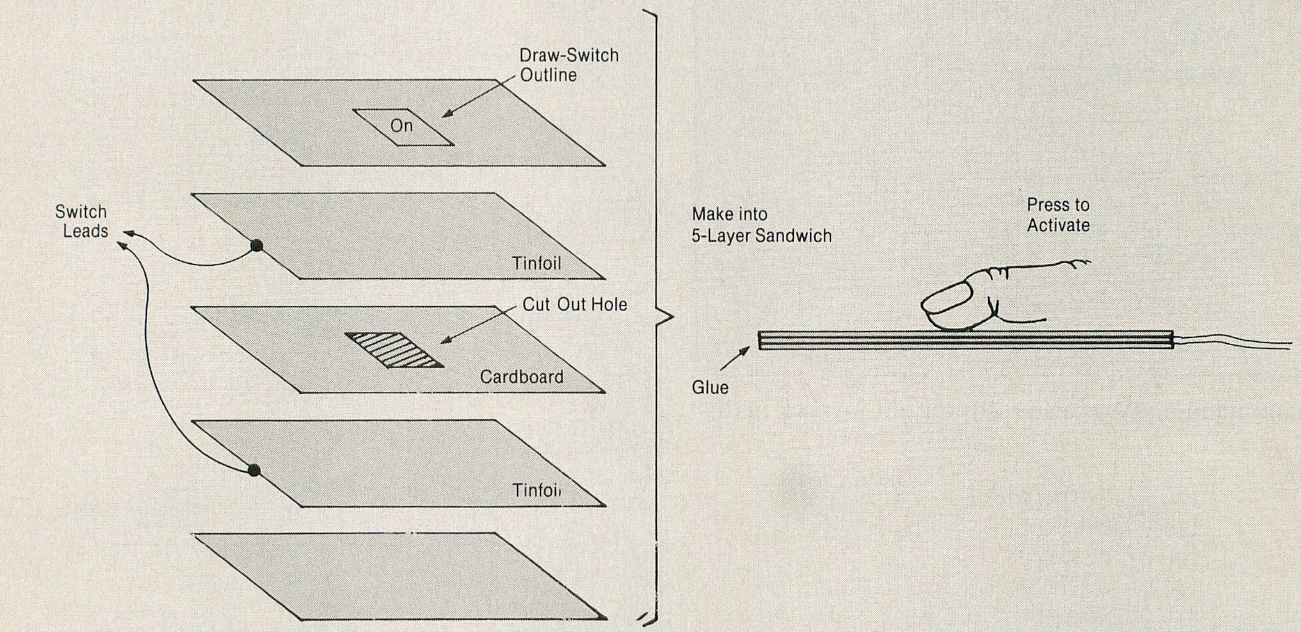


Figure 3: Homemade Switch

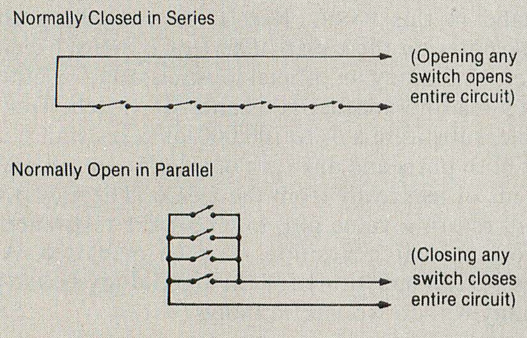

Normally Closed in Series
(Opening any switch opens entire circuit)
Normally Open in Parallel
(Closing any switch closes entire circuit)

Figure 4: Switches in Series and Parallel

Many varieties of switches are momentary switches that operate when you step on a mat, push a button, use a lever, bring a magnet close (for security systems), etc. Almost any switch will work with this application since the voltages and currents are low and not dangerous. You can even make your own switch by using two pieces of tinfoil separated by a piece of cardboard with a cutout in the center. (See Figure 3.) Although you wouldn't want to use it to switch 700,000 volts, it is fine for CoCo joystick use.

Figure 4 offers another hint on switches. Switches can be put in *series* if they are normally closed. In this case, activating one or more switches will open the circuit. If you are using normally open switches, they can be put in parallel, so activating one or more switches will close the circuit. That way many switches can be joined together (e.g., for a burglar alarm circuit that uses a switch at each window).

Many electronic devices act as switches. Radio Shack carries such devices as *opto-isolators* and *analog switches* that can be connected to joystick inputs. These are out of the realm of this article, however, so we won't go into the details here.

Substitute Resistors

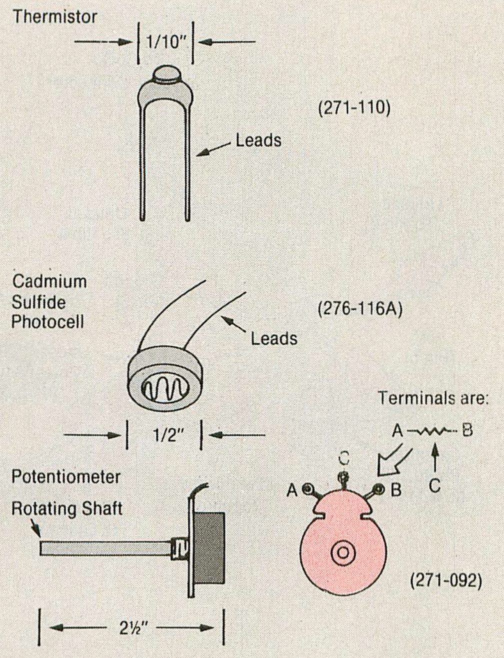
Besides the millions of switches lining those parts partitions at your local Radio Shack, there are many devices that can be used in place of the joystick potentiometers. These are a few we'll be using in this article:

- Thermistor: A resistor whose resistance varies according to temperature — a kind of thermal resistor. Using a thermistor, we can measure temperature reading.
- Cadmium Sulfide Photocell: A resistor whose resistance varies with the amount of light it receives. Used to measure the intensity of sunlight or room lights, or to detect when lights are turned off or on in a room. (See Figure 5.)
- Standard Potentiometer: A typical pot, or potentiometer, can be used in place of the one found in the CoCo joystick. Like switches,there are a million varieties of pots that range in ohms and may be either linear or audio taper. For our purposes, use a 100,000-ohm pot (100K) with a linear taper. The linear taper ensures that a rotation of one half turn will change the resistance by one half. (See Figure 5.)

How to Measure the World with Your CoCo

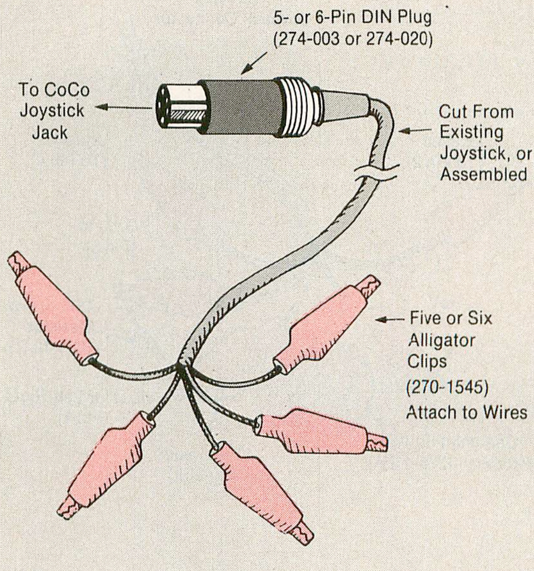
The first step in using your CoCo for the applications mentioned above is to replace one or more joysticks with a special cable. You can leave one joystick connected and plug the cable into the other joystick plug. Or you can unplug a joystick and replace it with a special cable.

One way to get a special cable is to sacrifice a joystick or



Thermistor
1/10"
(271-110)
Leads
Cadmium Sulfide Photocell
(276-116A)
Leads
1/2"
Terminals are:
A—ww—B
C
C
A
B
Potentiometer
Rotating Shaft
(271-092)
2½"

Figure 5: Resistive Devices Substituted for Joystick Potentiometer



5- or 6-Pin DIN Plug
(274-003 or 274-020)
To CoCo Joystick Jack
Cut From Existing Joystick, or Assembled
Five or Six Alligator Clips
(270-1545)
Attach to Wires

Figure 6: CoCo Joystick Special Cable

high-resolution joystick interface ($19.95 or $9.95). Cut the cable, getting as much length as possible. Strip the outer covering with scissors or wire cutters and expose two inches of each wire. Then cut off about one-half inch of covering on each wire to expose the bare wire.

You can also buy an Archer 6-Pin DIN Plug (Cat. No. 274-020). This plug fits the CoCo joystick connector. The bare DIN plugs require soldering five or six wires — no great chore if you're handy with tools. Use rosin-core solder and a small soldering iron. Use any general, stranded hookup wire. (Solid wire breaks easily after repeated bending.) Any gauge from 18 to 24 will do nicely.

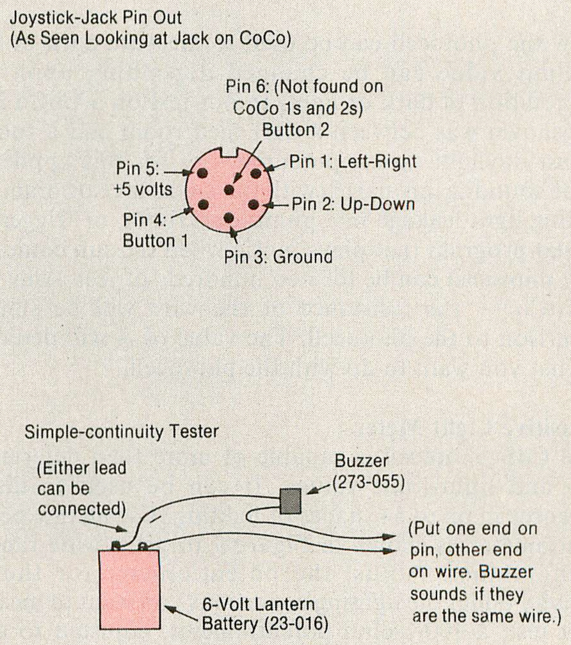
The ideal cable has a 5- or 6-pin DIN plug on one end to fit the right joystick connector and five or six wires on the other end. Connect alligator clips (Cat. No. 270-1545) to the five or six ends. The result will look like Figure 6.

Find and mark the function of each wire. To do this, trace the wires from the connector end either visually or by a continuity tester. (The pin-out and a simple continuity tester are shown in Figure 7.) Put a piece of masking tape around each lead as it is identified. (By the way, as I write this, I am connecting each lead to all other leads. There's no blinding flash of light as the CoCo keyboard melts down into a slag of plastic and Tandy labels.) Don't be too concerned about getting the leads all correctly identified.

Are the leads identified and marked? Good, now we can get down to business.

Dark and Light Detector

A cadmium sulfide photocell (Cat. No.276-116A) can be used to detect light or dark conditions. Connect the photocell to a 15K-ohm, ¼-watt resistor (Cat. No. 271-1337) and to



Joystick-Jack Pin Out
(As Seen Looking at Jack on CoCo)
Pin 6: (Not found on CoCo 1s and 2s) Button 2
Pin 1: Left-Right
Pin 5: +5 volts
Pin 2: Up-Down
Pin 4: Button 1
Pin 3: Ground
Simple-continuity Tester
(Either lead can be connected)
Buzzer
(273-055)
(Put one end on pin, other end on wire. Buzzer sounds if they are the same wire.)
6-Volt Lantern Battery (23-016)

Figure 7: Pin Out and Continuity Tester

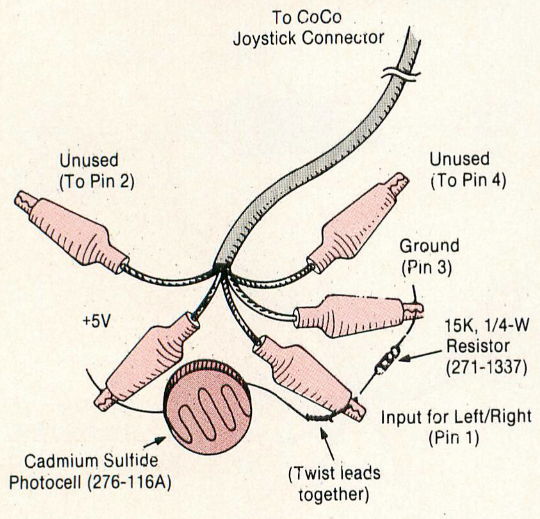

To CoCo Joystick Connector
Unused (To Pin 2)
Unused (To Pin 4)
Ground (Pin 3)
+5V
15K, 1/4-W Resistor (271-1337)
Input for Left/Right (Pin 1)
Cadmium Sulfide Photocell (276-116A)
(Twist leads together)

Figure 8: A Dark- and Light-Detector

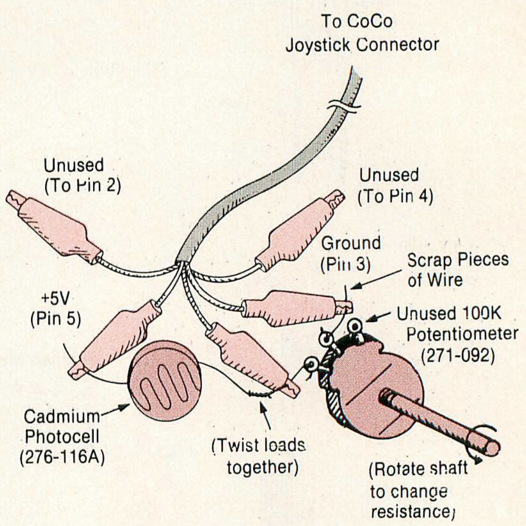

To CoCo Joystick Connector
Unused (To Pin 2)
Unused (To Pin 4)
Ground (Pin 3)
Scrap Pieces of Wire
+5V (Pin 5)
Unused 100K Potentiometer (271-092)
Cadmium Photocell (276-116A)
(Twist loads together)
(Rotate shaft to change resistance)

Figure 9: A Sensitive Light Meter

three leads from the special cable as shown in Figure 8. This brings in the photocell value as Variable A in the following routine:

```
100 A=JOYSTK(0)
140 IF A > 35 THEN PRINT "LIGHT" ELSE PRINT "DARK"
150 GOTO 100
```

Now the photocell can be used to measure dark or light. The limit value can be changed depending upon your interpretation of dark or light. In our test on a CoCo 3, the value shown was between a darkened room and a room in overcast daylight. Some potential uses for this application include sounding an alarm (with the BASIC SOUND command), signaling light leakage in a photo darkroom, or triggering a wake-up program that plays music when the sun comes up.

The photocell can be located hundreds of feet away from the CoCo — the resistance of the wire will be small in comparison to the photocell. The value of A will determine just what you want to do with the photocell.

A Sensitive Light Meter

The CdS photocell is capable of more than determining dark- and light-limit values. It can be used to discern differences in up to 64 shades of lighting. Use an inexpensive potentiometer as shown in Figure 9 to get a wide range of lighting values. Adjust the potentiometer for the best sensitivity under the lighting conditions you want to measure. In our test, a 100K-ohm potentiometer, adjusted to about mid-scale, measured lighting conditions inside a house.

You can scale the value measured by multiplying by a constant. This may change the measured value into more useful units. You can also establish as many limit values as you want based on these results:

```
1000 IF A<30 THEN PRINT "CLOUDY" ELSE IF A<40 THEN PRINT
"PARTLY CLOUDY" ELSE PRINT "SUNNY"
```

Some potential uses for this application include a photographic contrast meter, ambient light measurement, weather conditions or a light pen. Use up to four inputs (two channels on each joystick connector) to measure light intensity at four locations.

A Thermometer

A thermistor (Cat. No. 271-110) can be used to measure temperature; however, since the maximum number of values is 64 (0 to 63), it may be difficult to get within a degree of the temperature. Use the thermistor for an approximation of temperature. Like the photocell, this application can do a limit check to test for high versus low temperatures or measure a range of temperatures. The software is identical to the code for the photocell.

I calibrated the thermistor by immersing it in ice water and allowing it to reach room temperature (about 68 degrees in chilly California) and then measuring the body temperature of a Shetland sheepdog (by a procedure I won't document). The reading with the setup in Figure 10 was 17 for ice water, 25 for room temperature, and 32 for the Sheltie. Unfortunately, intermediate readings are not linear (i.e., halfway between 32 degrees and 68 degrees — 49 degrees — will not necessarily give a value of 21). You might have to get a value and convert it in the following manner:

```
1000 IF A=XX THEN A=XX ELSE IF A=XX THEN A=XX ELSE IF A=XX
THEN A=XX ELSE . . .
```

Like the photocell, the thermistor may be located hundreds of feet away and connected by a pair of wires. Use up to four inputs (two channels on each joystick connector) to measure temperatures at four locations. Potential uses for this application include fire detection, attic overheating, or freezing-point detection.

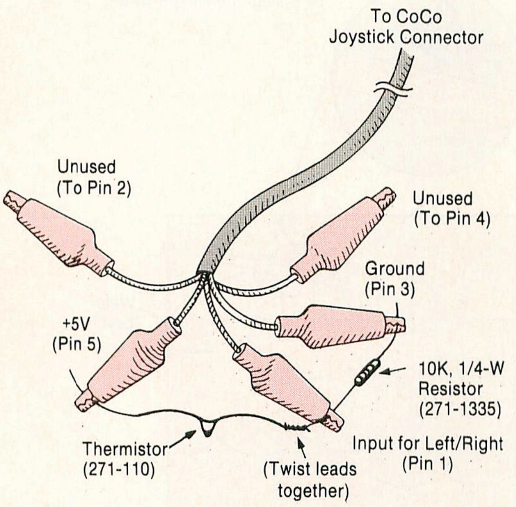

To CoCo
Joystick Connector
Unused
(To Pin 2)
Unused
(To Pin 4)
Ground
(Pin 3)
+5V
(Pin 5)
10K, 1/4-W
Resistor
(271-1335)
Input for Left/Right
(Pin 1)
Thermistor
(271-110)
(Twist leads
together)

Figure 10: A Thermometer

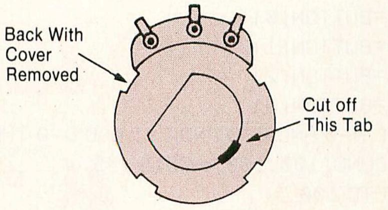

Back With
Cover
Removed
Cut off
This Tab

Figure 11: Modifying a Potentiometer

Measuring Wind Direction

A wind-direction measuring device may be made from a Radio Shack 100K linear taper potentiometer (Cat. No. 271-092). The pot can be opened by bending back the side tabs. Inside you'll find a stop that limits the rotation of the shaft. Break off this tab (see Figure 11) and put the pot together again. You now have a pot that will rotate clockwise or counterclockwise without limit. It takes some force to rotate the shaft; however, a large wind vane (shown in Figure 12) will do the job — even for slight winds.

The value returned will have to be converted to direction. The setup I used is shown in Figure 13. This can be done with the following routine:

```
1000 IF A=0 THEN D$="N"
1010 IF A>0 AND A<=5 THEN D$="NE"
1020 IF A>5 AND A<=14 THEN D$="E"
1030 IF A>14 AND A<=26 THEN D$="SE"
1040 IF A>26 AND A<=37 THEN D$="S"
1050 IF A>37 AND A<=47 THEN D$="SW"
1060 IF A>47 AND A<=57 THEN D$="W"
1070 IF A>57 AND A<=63 THEN D$="NW"
```

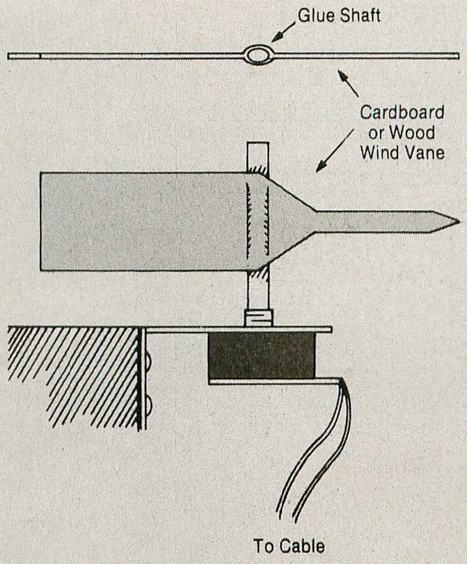

Glue Shaft
Cardboard
or Wood
Wind Vane
To Cable

Figure 12: Measuring Wind Direction

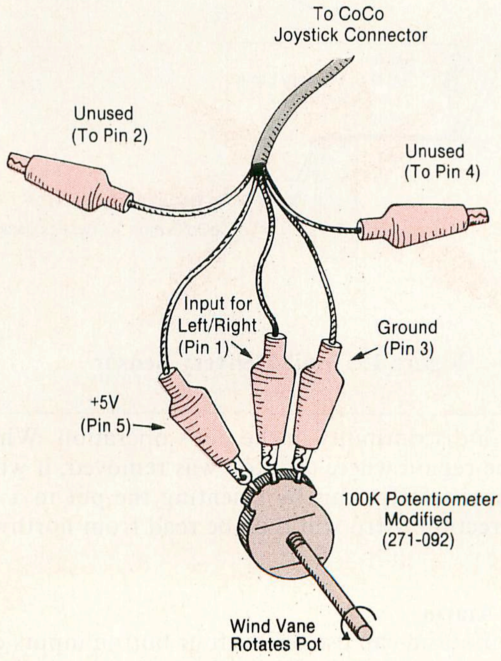

To CoCo
Joystick Connector
Unused
(To Pin 2)
Unused
(To Pin 4)
Input for
Left/Right
(Pin 1)
Ground
(Pin 3)
+5V
(Pin 5)
100K Potentiometer
Modified
(271-092)
Wind Vane
Rotates Pot

Figure 13: Wind Direction Indicator

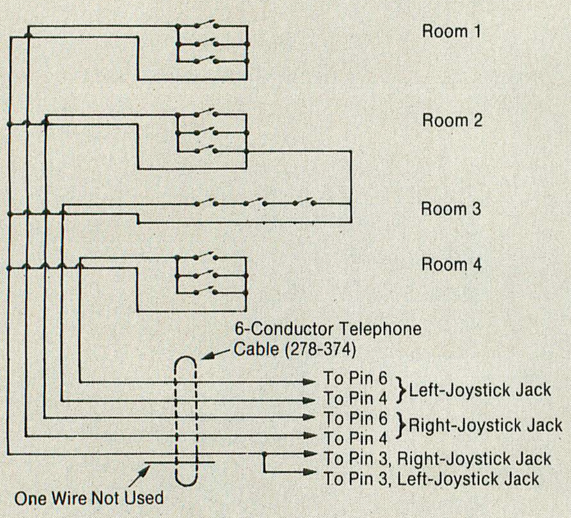

Room 1
Room 2
Room 3
Room 4
6-Conductor Telephone Cable (278-374)
To Pin 6
To Pin 4
Left-Joystick Jack
To Pin 6
To Pin 4
Right-Joystick Jack
To Pin 3, Right-Joystick Jack
To Pin 3, Left-Joystick Jack
One Wire Not Used

Figure 14: Burglar Alarm System

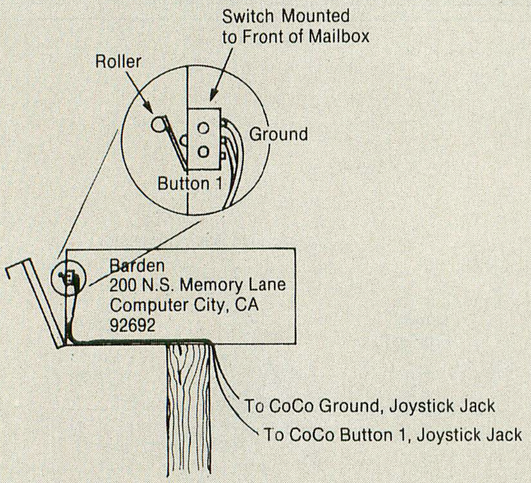

Switch Mounted to Front of Mailbox
Roller
Ground
Button 1
Barden
200 N.S. Memory Lane
Computer City, CA
92692
To CoCo Ground, Joystick Jack
To CoCo Button 1, Joystick Jack

Figure 15: Mail-Delivery Sensor

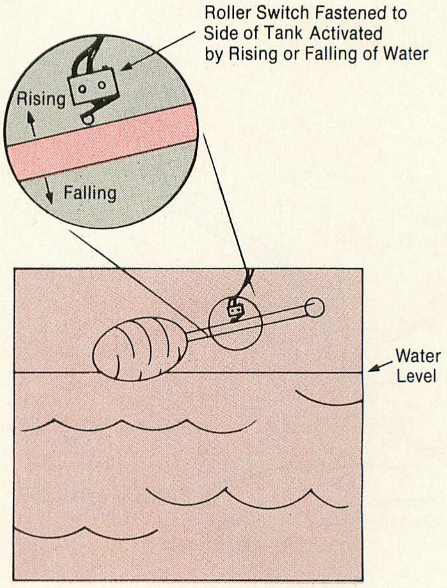

Roller Switch Fastened to Side of Tank Activated by Rising or Falling of Water
Rising
Falling
Water Level

Figure 16: Water-Level Detector

There is a discontinuity in the pot's operation. When the pot is in the region where the stop was removed, it will read zero. Compensate for this by orienting the pot in a northwestern direction. Zero will then be read from northwest to northeast.

A Burglar Alarm

A burglar alarm can use one to four button inputs on one or both joystick connectors. Wire normally open switches in parallel and normally closed switches in series. The alarm may detect either one or zero (normally closed or normally open). Radio Shack and other stores have a host of security devices, many of which are switches — magnetic door switches, window switches, mat switches, etc. For more information on security, buy *How to Hook Up High-Tech Electronics* (Cat. No. 62-1088) at Radio Shack. A sample security setup is shown in Figure 14. Use the following code for the CoCo 3:

```
100 A=BUTTON(0)
110 B=BUTTON(1)
120 C=BUTTON(2)
130 D=BUTTON(3)
140 IF A=0 AND B=0 AND C=1 AND D=0 THEN GOTO 150
145 SOUND(100,100): GOTO 145
150 GOTO 100
```

Naturally, the switches can be located dozens of feet from the CoCo. This is not generally recommended procedure for this electronic connection, but I experienced no difficulties and no false readings on inputs from 60 feet away using intercom cable. Any size wire from about 18- to 24-gauge may be used. Stranded wire is best because it is less susceptible to breakage after bending, but solid wire can be used in a permanent installation.

Roller-Switch Applications

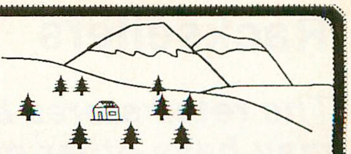
Radio Shack sells a switch (Cat. No. 275-017) with a roller arm, which triggers with very light pressure. It can be used in an application such as detecting mail delivery. (See Figure 15.) Opening the mail box opens the switch, which can then be detected remotely by your CoCo. The roller switch can also be used in a burglar alarm application — when an object is lifted, the switch will spring open. To do this, use the code from above.

A water-level detector can be made by a toilet-bowl float and arm, as shown in Figure 16. Rising or falling water of a certain limit will trigger the switch.

If you would like to see another column with these applications, please write to me with your thoughts, comments, hopes, dreams and political views at P.O. Box 3568, Mission Viejo, CA 92692.

See you next month with more CoCo tips.

Burke & Burke



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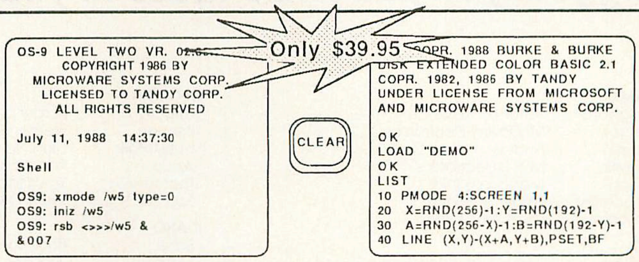

```
OS-9 LEVEL TWO VR. 02.0
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  MICROWARE SYSTEMS CORP.
   LICENSED TO TANDY CORP.
     ALL RIGHTS RESERVED

July 11, 1988  14:37:30

Shell

OS9: xmode /w5 type=0
OS9: iniz /w5
OS9: rsb <>>>/w5 &
&007
```

```
OPR. 1988 BURKE & BURKE
DISK EXTENDED COLOR BASIC 2.1
COPR. 1982, 1986 BY TANDY
UNDER LICENSE FROM MICROSOFT
AND MICROWARE SYSTEMS CORP.

OK
LOAD "DEMO"
OK
LIST
10 PMODE 4:SCREEN 1,1
20  X=RND(256)-1:Y=RND(192)-1
30  A=RND(256-X)-1:B=RND(192-Y)-1
40 LINE (X,Y)-(X+A,Y+B),PSET,BF
```

Burke & Burke's new R.S.B. program gives you a complete, OS9-compatible version of Disk Extended Color BASIC. We've added new software for OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

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Your BASIC programs can take full advantage of great OS9 features like hard disks, no-halt floppies, multi-tasking, and 2 MHz operation.

R.S.B. requires a CoCo 3 with at least 128K RAM (512K recommended), a floppy controller with either Tandy Disk Extended Color BASIC or DISTO CoCo 3 CDOS, and Level 2 OS9.

R.S.B. Version 1.2 $39.95

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- Average access 30% faster than SASI systems
- Uses PC-type hard disk drives & controllers
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- Compatible with most RS-232 interfaces
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- Use with HYPER-I/O to share your hard disk between BASIC and OS9

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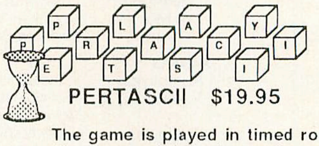

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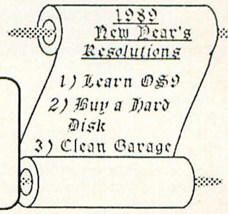
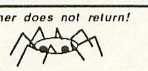


Daggorpatch

Yet another does not return!



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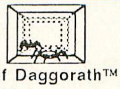

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  W. R. Hall, Inc. 115
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Dr. Preble's Programs 99
EZ Friendly 135
Frank Hogg Laboratories 33
Game Point Software 57
Gimmesoft 126, 127
Granite Computer Systems 81
HawkSoft, Inc. 85
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ICR Futuresoft .... Outsert
J & R Electronics 97
JR & JR Softstuff 45
JWT Enterprises 89
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Kenneth Leigh Enterprises 89
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Metric Industries 12
MichTron .... BC
Micro Works, The 79
Microcom Software 9, 11, 13,
  15, 16, 17
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PXE Computing 7
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  Adventures IV 120
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Rainbow on Tape & Disk ...... IFC
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Rulaford Research 87
SD Enterprises 25, 93
Second City Software 161
Simply Better Software 141
SpectroSystems 45
SPORTSware 113
Sugar Software 123
Sundog Systems 53
T & D Software 22, 23, 31, 73
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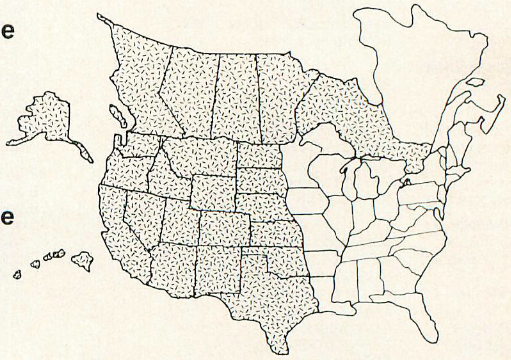

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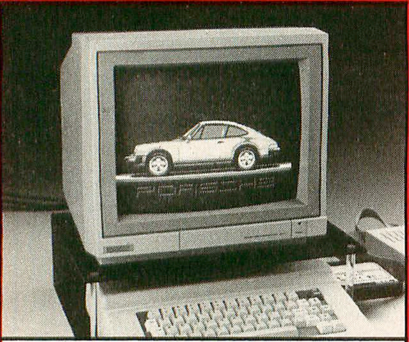

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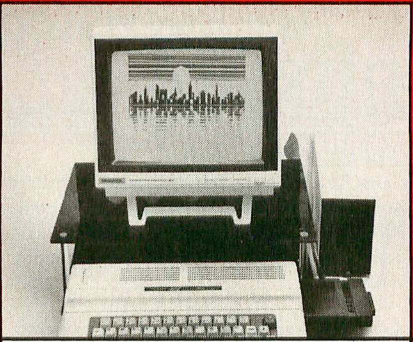

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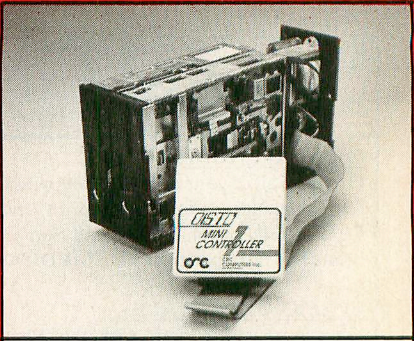

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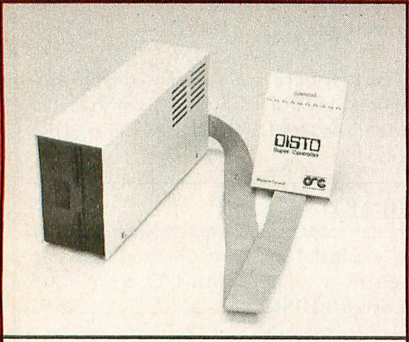

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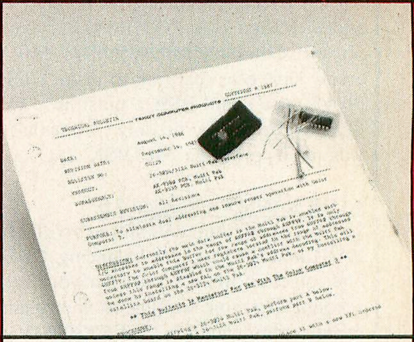

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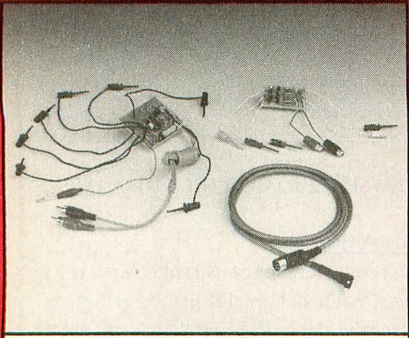

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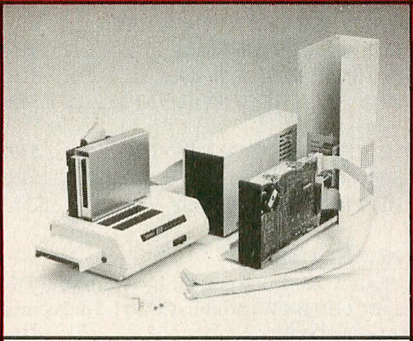

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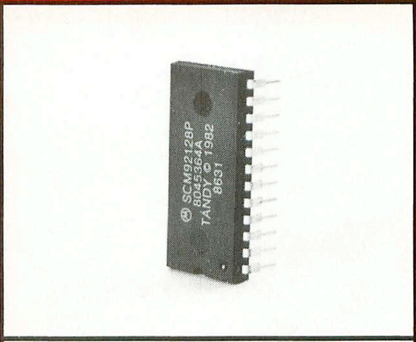

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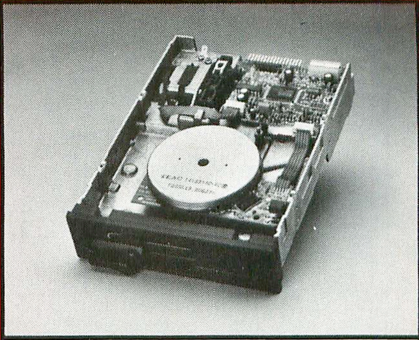

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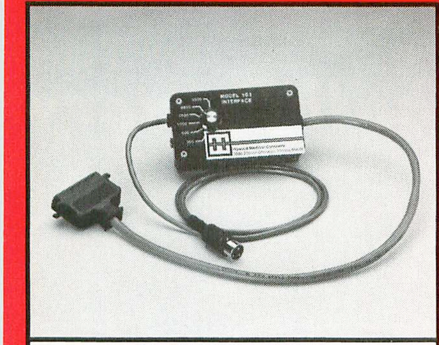

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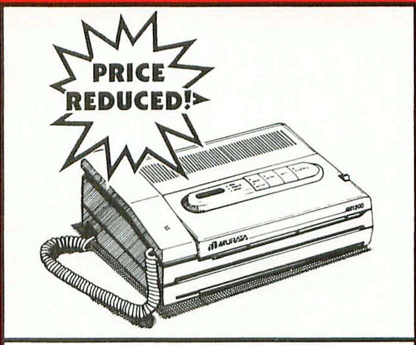

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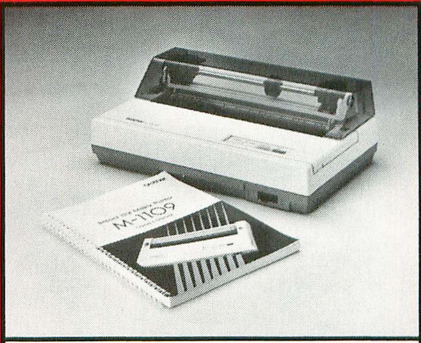

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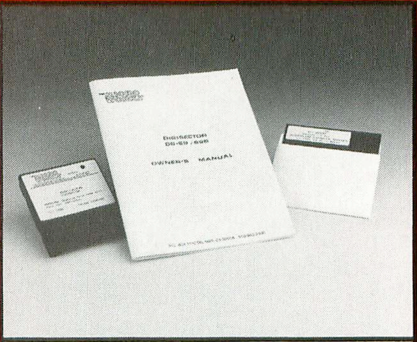

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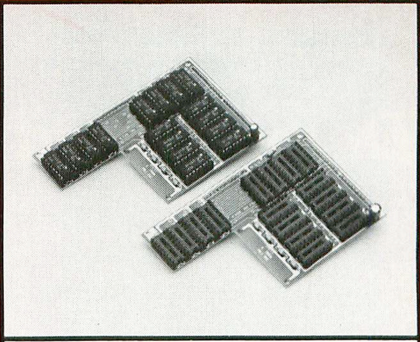

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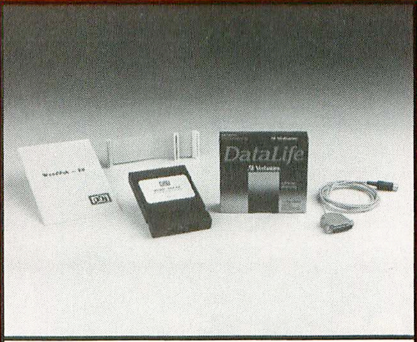

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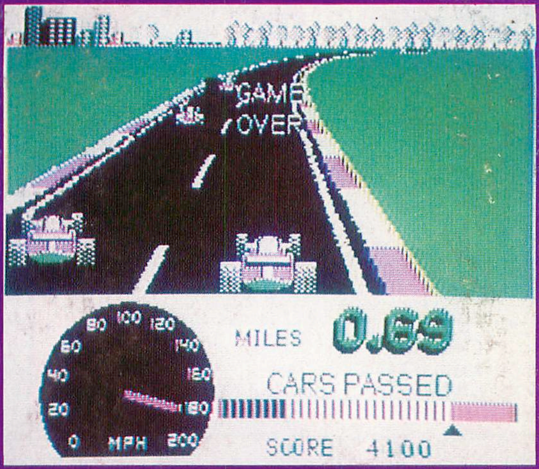

As the checkered flag drops your pulse rises in this lively arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for exciting racing. Vie for time as you glide through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but be quick! Some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery test your skills in this Pole Position™ type game.

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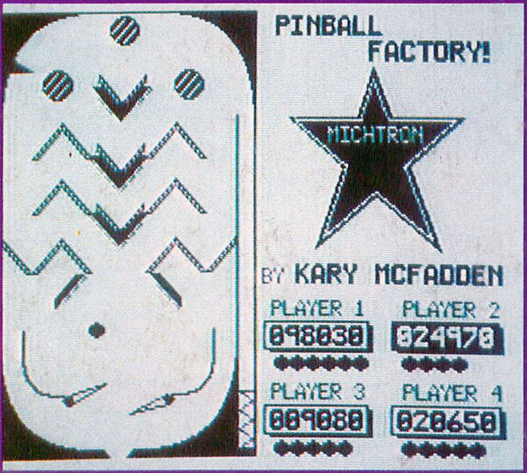

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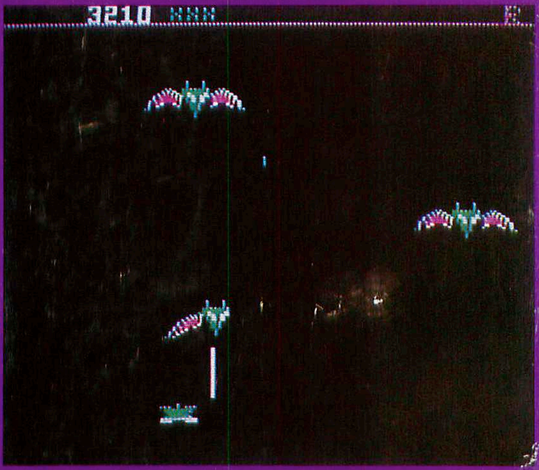

The first waves of flying, diving, bloodthirsty bats are arriving. Move, fire, and move again. It's a never ending battle. If you are lucky enough to defeat the bats, be ready for a much greater challenge, The *Evil Demons* themselves. Destroy a wing and another takes its place. Only a direct hit can save you now. It will take great skill to triumph. If you do, then you better be ready for the *End*. The Demon Flag Ship descends to destroy your remaining ships. Your only hope is to penetrate the hull, break through the shield, and destroy the dreaded Gargoyle.

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